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[OFFICIAL NOTICE.]

Annual Meeting, American Gas Institute.

HEADQUARTERS, AMERICAN GAS INSTITUTE,
29 West 39th St., New York City,
August 17th, 1910.

The Annual Meeting of the American Gas Institute will be held at Headquarters, 29 West 39th street, New York, beginning Wednesday, October 19th.

Hotel headquarters will be at Hotel Astor, Times Square.

It is important to engage rooms early.

The Committee on Arrangements has not entirely completed its programme, but has plans for a banquet Thursday evening, at the Hotel Astor, a theater party on Wednesday evening, for members and accompanying ladies, and a steamer excursion on Friday.

The following hotels have quoted rates:

Name.	Location.	Single Room. Without Bath.	Single Room. With Bath.	Double Room. Without Bath.	Double Room. With Bath.
Breslin	Broadway cor. 29th St.	$1.50	$2.50	....	$4.00 up.
Gilsey	" " " "	1.00	2.00	$2.00	3.00 "
Imperial	" " 31st "	2.00	2.50	3.00	4.00 "
Martinique	" " 33d "	1.50	2.50	2.50	3.50 "
Herald Square	" " 34th "	1.50	2.00	2.50	3.00 "
Marlborough	" 36th and 37th "	1.00	1.50	2.00	2.50 "
Knickerbocker	" and 42d "	....	3.00	4.00	5.00 "
Astor	Times Square	2.50	3.50	3.50	4.50 "
"	" "	3.00	..	4.00	.... "
"	also, room with shower bath.	3.00	3.50	4.00	4.50 "
Manhattan	42d and Madison Av.	2.50	3.00	5.00	5.00 "
Belmont	" " Park "	2.50	3.50	3.50	4.50 "
Grand Union	" " " "	1 00	2.50	2.00	3.50 "
Holland	5th Av. and 30th St.	2.00	3.50	3.00	5.00 "
Waldorf-Astoria	5th Av. and 34th "	3.00	4 00	5.00	6.00 "
Savoy	5th Av. and 59th "	2.00	3.00	3.50	4.50 "
"		2.50	....	....	.... "
"	American plan	4.50	....	....	.... "
Netherlands	5th Av. and 59th St.	2.00	3.00	3.00	4.00 "
Plaza	" " " " "	2.50	4.00	....	6.00 "
Murray Hill	Park Av. and 40th "	2.00	3.00	3.00	4.00 "

Special rates are being arranged by the Trunk Line and other Railway Associations, details of which will be announced later.

It is planned to have a morning and afternoon session, Wednesday and Thursday, with lunch served in the Engineering Societies Building, between sessions, and to devote Friday to the excursion.

The Technical Committee announces that it has 16 very interesting papers to be presented, covering technical, commercial and general subjects.

Further announcement in relation to subjects of papers and details of meeting, will be made later. A. B. BEADLE, Secretary.

BRIEFLY TOLD.

THE EIGHTEENTH MEETING, PACIFIC COAST GAS ASSOCIATION.—A correspondent in San Francisco, Cal., writing under date of the 30th ult., among other things said: * * * I am giving you herewith a list of the papers to be read before the meeting, together with the title of the paper, the name of the author, his position, etc.

President's Address, by Mr. W. B. Cline, President, Los Angeles Gas and Electric Company.

"Progress in Oil Gas Manufacture," by Mr. J. M. Berkley, Engineer, Domestic Gas Company.

"Works' Economies," by Mr. Sherwood Grover, Engineer, Pacific Gas and Electric Company.

"The Municipal Inspection of Gas and Meters," by Mr. Wm. Shade, City Gas Inspector, Los Angeles.

"Gas Leakage," by Mr. Geo. Kirk, Superintendent Street Main Department, Oakland Division, Pacific Gas and Electric Company.

"Belations with the Public," by Mr. R. H. Ballard, General Manager, Southern California Edison Company.

"Necessities for a Public Service Commission in California," by Mr. John A. Britton.

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"General Policy Regarding Pipe Extensions," by Mr. C. A. Luckenbach, Superintendent of Construction, Los Angeles Gas and Electric Company.

"Prevention of Accidents," by Mr. J. P. Coghlan, Claims' Agent, Pacific Gas and Electric Company.

"The Oil Situation from the Gas Man's Viewpoint," by Mr. H. W. Burkhart, Superintendent Gas Department, Southern California Edison Company.

"Suburban Distribution," by Mr. L. H. Newbert, Manager, San Mateo District, Pacific Gas and Electric Company.

"The Introduction of the Gas Furnace," by Mr. Chas. F. Stamps, Jr., Manager, Los Angeles Gas and Electric Appliance Company.

"Fire Insurance and Protection," by Mr. R. J. Cantrell, Property Agent, Pacific Gas and Electric Company.

"The Chemical Control of Gas Works," by Mr. E. L. Hall, Chemist, Portland Gas Company.

"Wrinkles," by Mr. Wm. Shade.

"Experiences," by Mr. Leon B. Jones, Superintendent, Potrero Station Gas Department, San Francisco Gas and Electric Company.

The outings have been arranged as follows, and are complimentary to the visiting members of the Association, their wives, sisters, daughters and friends, on the part of the Company, under the name of "Outing Day."

Thursday, September 22d, will be known as "Southern California Edison Day." At 9 o'clock A.M., the Edison Company will take the members of the Association and their friends on an excursion to Soldiers' Home, Santa Monica, Ocean Park, Venice and Redondo. At Redondo luncheon will be served at 12, noon. Dancing, bathing and other entertainments during the afternoon; returning to Los Angeles at 5 o'clock P.M.

Friday, September 23d, will be known as "Domestic Gas Company Day." At 9 o'clock A.M. the Domestic Gas Company will take the members of the Association and their friends, on an excursion to Mount Lowe, luncheon will be served at noon. Returning to Altadena, at 2 o'clock P.M., automobiles will meet them for a trip through Altadena, Pasadena, South Pasadena, Alhambra, Eagle Rock Valley to Casa Verdugo (where light refreshments will be served), thence to Glendale, Tropico, Hollywood and Los Angeles.

Saturday, September 24th, will be known as "Los Angeles Gas and Electric Corporation Day." The Los Angeles Gas and and Electric Corporation will take the members and their friends on an excursion through Watts, Compton and Wilmington, to San Pedro, at which point steamer will be boarded for Catalina Island. Lunch will be served at noon, in the Hotel Metropole, Avalon, on the Island. The meeting, which will be held in Choral Hall, Auditorium Building, Fifth and Olive streets, will be called to order promptly at 10 o'clock, A.M., September 20th. The banquet will be held at the Hotel Alexandria, Wednesday, September 21st, at 8 o'clock. It has been decided by the Directors of the Association to give an Appliance Exhibition. The Central Park Skating Rink, No. 416 West Sixth street, has been secured for this purpose. Up to the present time more than 20 of the large manufacturers of appliances have signified their intention of taking space in this hall for the exhibition of their appliances. (There are yet a large number to hear from.) This exhibition will be open to all members and their friends, as well as the general public. It is the intention of the Directors to make this appliance exhibition one of the strong features of this year's convention. Any manufacturer who has not made application for space in the exhibition hall can do so by communicating with Mr. Chas. F. Stamps, Jr., 639 South Hill street, Los Angeles, Cal. With the exception of one of the early meetings of the Pacific Coast Gas Association, which was held at Sacramento, all others have been held in San Francisco to date. On account of so many of the members of the Pacific Gas and Electric Company and subsidiary companies being members, and at various times officers, and always taking a very active part in the discussion, there has been a feeling among the members, from Southern California in particular, that the Pacific Coast Gas Association was merely a branch of the Pacific Gas and Electric Company. This has tended toward a feeling of dissatisfaction, and there have been in the past rumors to the effect that a Southern California Association was to be formed. Therefore, last year, when the members from Southern California came to the meeting in San Francisco, wearing buttons which read "Los Angeles, 1910," it was deemed wise to break an unwritten law, and hold the meeting for this year in Los Angeles. This was unanimously accepted by the members, although there was a feeling that the attendance would be small, due to so many of the members residing in the Northern part of the State, and being unable or unwilling to make the trip to the Southern Metropolis. With this knowledge before them, the Southern members, particularly Mr. Cline, President for this year, resolved to leave no stone unturned in their endeavors to make this year's meeting "The Banner One" in the history of the Association.

Inscription Badge for Convention Use.

The list of papers covers a very wide range of particularly timely and interesting subjects, the author in each case being particularly qualified by experience and training to give an excellent and educational tone to them. Also, they are papers that will cause considerable discussion. Heretofore, the members of the Association have been privileged to enjoy but one day of outing at the expense of the Association. This year, as will be seen, the three companies in Southern California engaged in the gas industry, are each putting up for a very excellent outing, anyone of which would compare more than favorably with any of the outings heretofore held. From the percentage of acceptances, or rather acknowledgments, of intentions to attend, so far received, the indications are that there will be a larger attendance than at any other time in the history of the Association. There have been about 35 applications for membership since the last meeting, 65 per cent. of which have been from the Southern portion of the State. The membership badge this year will be quite a handsome affair, as you will see from the sample.

CURRENT MENTION—

THE JOURNAL for August 22d and September 5th contained four letters on "Gas Range Cooking," which were prepared by Mrs. Helen Armstrong for the Gas Light and Coke Company, of Chicago, and which were duly copyrighted by the authoress. We presumed that, consequent upon certain negotiations, we had the right to reproduce (rather, republish) the series entire. As usual, there are two sides to every bargain, and the other side, with quite some fairness, too, having concluded that we did not give both Company and authoress all the credit that was theirs, ask us to give it to them. Well, this seems the best we can do. The four articles (the complete series embraces six articles or letters) that appeared in our columns were prepared for the Peoples Gas Light and Coke Company, of Chicago, by Mrs. Helen Armstrong, and were copyrighted by her. We shall not publish the remaining two.

THE Massachusetts Lighting Companies, of Boston, Mass., have secured control of the Gloucester (Mass.) Gas Light Company, and it is understood that the purchasers will assume the management of the property as soon as the necessary formalities to the takeover have been complied with. We surely hope this does not portend the retirement from active service of Mr. John A. Coffin, to whose patience, skill and vigilance the former owners of the Gloucester Company owe everything they ever got out of it—a good, steady income, often secured at the practice of much ingenuity and self-denial on the part of Superintendent Coffin.

THE Exhibition Committee, in charge of the December exhibition, in Boston, of gas goods of all kinds, under the auspices of the National Commercial Gas Association, has awarded the contract for piping, which is really a huge matter. Under the plans a gas supply is arranged for that will exceed largely any other like provision. This, to the end that no complaint whatever may arise respecting insufficient pressure. The plans for the decorative treatment are said to provide for something quite unusual, and it is also proclaimed the effectiveness of the scheme will be exceeding. In respect of this, however, we may be forgiven for remarking that if these equal in that respect those of last December in Madison Square Garden, we all will shout *peccavi*. The plans for lighting were not at this writing completed, but the chandeliers are to be of a highly decorative sort. Applications for space are being received steadily, and every indication points toward an exhibition which will eclipse anything yet held along these lines.

MR. RICHARD G. STEWART, who has been in charge of the Texarkana (Tex.) street car system, has tendered his resignation to the Texarkana Gas and Electric Company. He goes to Memphis, Tenn., for which section he has obtained the agency for the Pierce-Arrow motor cars.

THE vote of the residents of Cedar Rapids, Ia., on the proposition to grant a frauchise to Mr. Thos. D. Miller and associates, for the operation of an opposition gas works there, largely favored the proposition.

The Manufacture of Carbonate of Ammonia from Gas House and Coke Oven Plant Liquor.

[Prepared for us by Mr. R. W. Hilgenstock, Lipzig-Plagwitz, Germany.]

Though almost all the ammonia which is contained in gas liquor, is carbonate of ammonia $(NH_4)_2CO_3$, it is mixed, however, with many other impurities; for instance, sulphide of ammonia $(NH_4)_2S$, ammonia cyanide, NH_4Cn, which would make it difficult and very expensive to recover a good, salable, commercial product and separate it from these harmful compounds.

There are, of course, a variety of processes for the manufacture of this product, and most of them are based on the decomposition of an ammonia compound, at the same time adding carbonic acid in one form or the other. Lunge, for instance, in his book "Coal Tar and Ammonia," gains it by mixing ammonia sulphate with calcium carbonate. The mixture is then heated in iron retorts and ammonia, carbonic acid and steam vapors (the latter must always be present) form, when cooling off, solid, hard carbonate of ammonia, calcium sulphate or gypsum being the residue left in the retorts. The mixture of 1 part sulphate of ammonia and 1½ to 2 parts very fine carbonate of calcium, which very often is yet mixed with some charcoal powder, is heated in cylindrical horizontal retorts, several being heated by one fire, similar to gas, or wood distillation retorts. The heat must be very low at the beginning; later on, however, it must be brought up until the retorts are red hot. The escaping vapors are caught in a wide lead pipe, which ends in a lead chamber, which again is connected with two or three other chambers, so that the vapors, that are not condensed in the first, have to go in the second and at least in the third chamber; leaving which last one, the outcoming gases have to pass a small lead tower, filled with crushed coke and sprayed with diluted sulphuric acid, which will absorb any escaping ammonia, forming sulphate of ammonia and setting free carbonic acid. In the chambers the condensation takes place by air cooling. The chambers can, however, also be provided with a water cooling jacket. It takes several operations until a crust in the chambers is formed thick enough to take it out. When this is the case, the crust is knocked down from the outside and the inlet door opened and the material is wheeled out. Care must be taken that the crust does not grow too thick, because this prevents good cooling, which again is the cause that the salt becomes too hard and bakes on the lead walls.

The product, which is recovered from the first operation, is very impure, especially when raw sulphate of ammonia has been used, it has a brown color, due to tarry substances, contained in the sulphate. Occasionally it is sold as ammonium carbonicum pyro-oleosum. Besides the tarry impurities, it also contains some calcium carbonate and sulphate of calcium. After Divers who, however, worked only in a small scale, got this product, it had not the composition of the commercial carbonate of ammonia, because no ammonia escapes during the process of distillation; it is, therefore, neutral carbonate of ammonia $(NH_4)_2CO_3$ or possibly ammonia carbaminate $(NH_4)CO_2(NH_2)$. When the pipes are not tight or warm, an acid carbonate is formed and the latter (*i. e.*, the salable salt) is gained in re-subliming the first product.

Another process has been worked out lately by the writer, based on information which he received from Mr. Heintze, of Gisenitz, Saxony-Altenburg, who worked many years on the development of his ideas, which really form the basis and foundation for this process, and it gives me great pleasure to express at this place again my best thanks to this gentleman for his kind, valuable and unselfish assistance in my work. As originator, however, the late Professor Heinrich Hirzel, one of our German pioneers in the ammonia and tar industry, must be named, who was by death, about 2 years ago, alone prevented from finishing this work. Though I did not have the pleasure of knowing him, the following lines are written in his memory and as a monument for his merits in helping to bring up our chemical industry to that high perfection at which it is to-day.

To do away, in the first place, with the very inconvenient residue of calcium sulphate, which really is a nuisance, the ammonia contained in the gas liquor is worked up into aqua ammonia in similar apparatus as described lately in my article in the Journal. The gas liquor, as it is recovered in gas works and coke oven plants, is first preheated in a specially constructed still (A) up to a temperature of 93° C. At this temperature most of the carbonic acid and sulphuretted hydrogen escape; the ammonia, which might be driven out in the heating chamber is absorbed again by the downcoming cold gas liquor. Of course, some CO_2 and H_2S will also be absorbed again, but inasmuch as much less ammonia is driven off as CO_2 and H_2S, the two latter compounds are driven off in the free air, because the downcoming cold gas liquor is almost saturated with carbonic acid and sulphuretted hydrogen and only the small parts of ammonia, which are driven off from the heating chamber and absorbed again, can take care of some CO_2 and H_2S, forming carbonate and sulphide of ammonia respectively. The liquor, which leaves the heating chamber of the preheater, contains still some carbonic acid and sulphuretted hydrogen and is pumped, in a mixing vessel which is arranged with paddles and in which milk of lime from the mechanical lime mixer is also pumped. Two principal chemical reactions take place now, the remaining carbonate of ammonia is decomposed and carbonate of calcium is formed, while ammonia sulphide, respectively, the sulphuretted hydrogen, forms calcium sulphide with the oxide of calcium, contained in the milk of lime. It is advisable, however, to make an analysis of the gas liquor every few hours, when it leaves the heating chamber of the preheater to find out exactly how much CO_2 and H_2S, as well as fixed ammonia, it still contains, because the needed quantity of calcium oxide, or rather of lime, can then very easily be determined after the following formula: Knowing that

17 parts of fixed ammonia require 28 parts CaO for decomposition.
22 " " carbonate acid " 28 " " " "
34 " " sulphuretted hydrogen " 56 " " " "

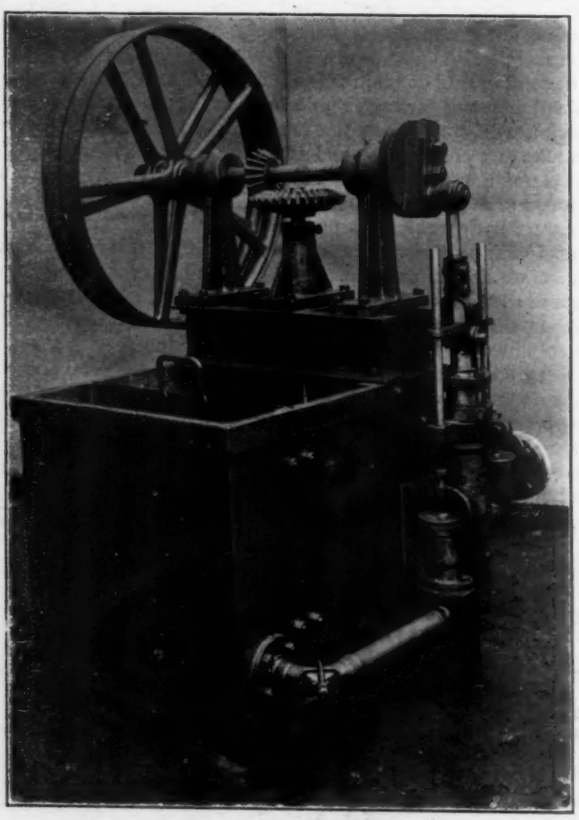
we will take

Ng as the percentage of the total ammonia contained in the gas liquor.
Ns as the percentage of the volatile ammonia contained in the gas liquor.
Ng-Ns as the percentage of the fixed ammonia contained in the gas liquor.
C as the percentage of the carbonic acid contained in the gas liquor.
S as the percentage of the sulphuretted hydrogen contained in the gas liquor.
n as the percentage of the calcium oxide contained in the lime.

For 1,000 pounds of gas liquor there will be required $[28 : 17(Ng-NS) + 28 : 22\ C + 56 : 34] \times 10 \times \frac{100}{n}$ or abreviated $[22\ (Ng-Ns) + 17\ C] \times \frac{100}{n}$ pounds of lime. Having now the total amount of lime, which is needed for 1,000 pounds of gas liquor, we can easily determine how strong we have to make our milk of lime. The following table gives the contents of lime in pounds for each degree Beaume in 1 gallon of milk of lime:

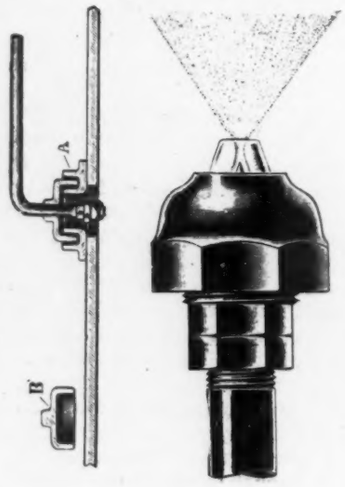
Degrees B.	Pounds Lime per Gallon.	1 Gallon Weighs.	Degrees B.	Pounds Lime per Gallon.	1 Gallon Weighs.
1	0.063	8.45	9	0.714	9.07
2	0.140	8.60	10	0.799	9.13
3	0.216	8.70	11	0.884	9.20
4	0.306	8.74	12	0.977	9.27
5	0.391	8.80	13	1.071	9.34
6	0.476	8.88	14	1.164	9.41
7	0.552	8.93	15	1.258	9.48
8	0.637	9.00			

When thoroughly mixed, the mixture of gas liquor and milk of lime flows down into the top section of the still *C*, where it travels down from section to section and comes in contact with always hotter steam, which drives off the ammonia in form of steam ammonia vapors. As it is an absolute necessity to get the ammonia as dry as possible before further purification, a cooler *D*, of special construction, is arranged over the still; the condensed water flows back into the still, while the almost dry ammonia gas is let first through a washer *E*, filled with a solution of sodium hydrate. In this washer, the last particles of carbonic acid and sulphuretted hydrogen, as well as the last rest of moisture, still contained in the ammonia gas, are detained. After this process the ammonia is washed with oil (paraffine oil or the like) in washer *F*, to remove the mechanically carried particles of tarry substances. Behind this washer, two bone black filters G_1 G_2 are arranged, which serve the purpose of retaining all the impurities, known under the collective name, "empyreuma" in the first place pyridine, a compound of very bad smelling odor. After leaving these filters, the ammonia gas is pure and ready for absorption. For this purpose it is brought, to get a uniform pressure in the gasholder *H*, and from there into the absorbing vessels T_1 T_2. At the same time carbonic acid from the steel bottles O_1 O_2, in which it is contained in liquid form, is added to the ammonia absorbed in the vessel, forming carbonate of ammonia. Of course, care must be taken that ammonia and carbonic acid are fed in the respective proportions. The liquid in the vessel would naturally warm up, due to the chemical heat, and to prevent this a cooling coil of sufficient size is provided. As soon as the liquor in the vessel shows a



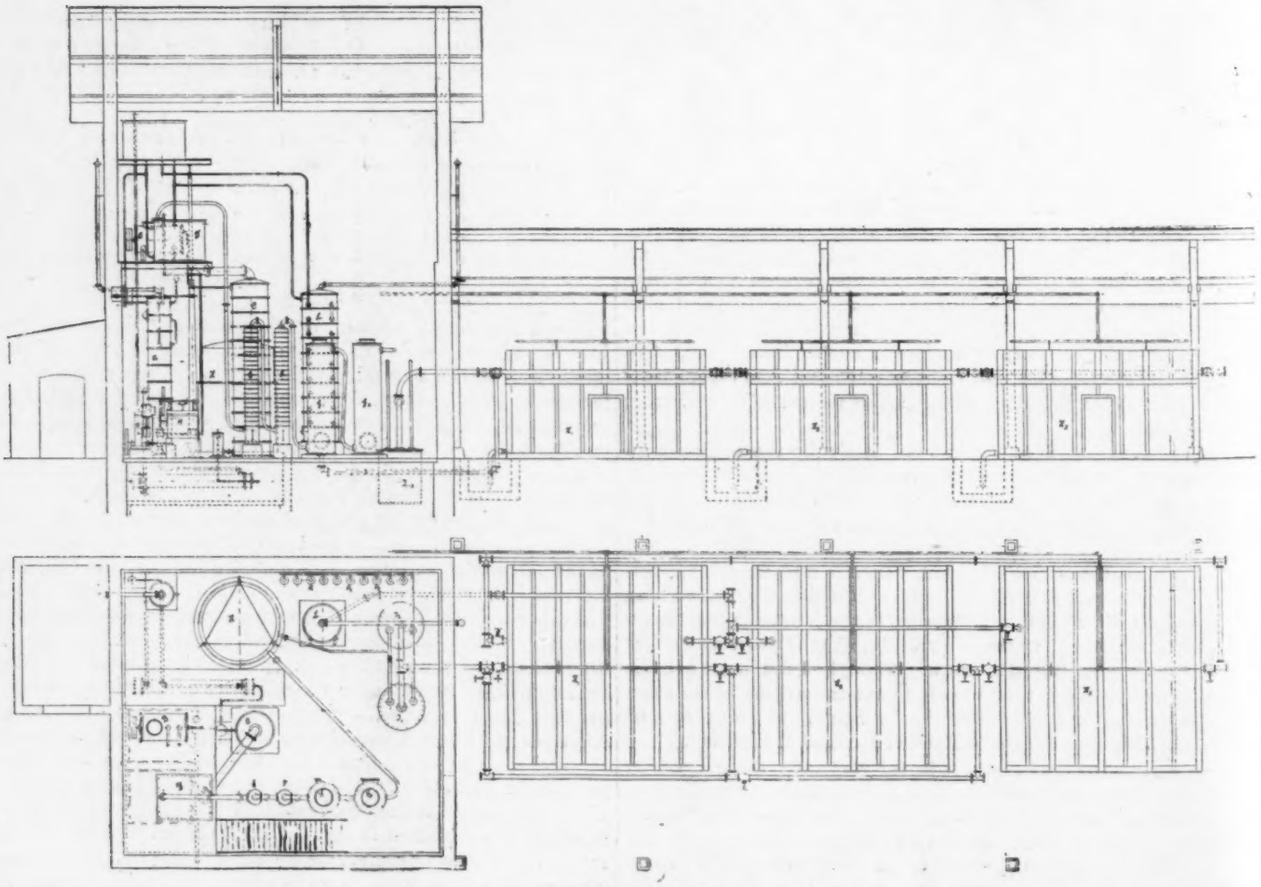
A.—Mechanical Lime Mixer.

through lead chambers K, K_1, in a similar way as described above. The washer, filled with diluted sulphuric acid, and placed behind the last lead chamber, as described in the Lunge process, is replaced by a water cooled water washer L. The gases are suctioned through the different sections by a powerful Körting ejector. In making this arrangement it is not nece-sary to always buy new sulphuric acid, which must be considered as a loss, and further, no lime is needed, which had to be provided to decompose the sulphate of ammonia for regaining the ammonia, and there would be no accumulation of calcium sulphate (gypsum). The lead chambers are cooled with a water spray C, arranged on top, and are each provided with 2 doors, wide and high enough that a man can pass them with a wheelbarrow. To induce the necessary steam vapors into the chambers D, a spray of special construction D, is provided on several places of the roof. Great care must be taken to have a uniform distribution of the steam vapors, in order to get a salt of uniform composition. At the lowest



C.—Water Spr y Made of Hard Glass (f r Lead Chambers).

D.—Arrangement of Spray in Lead Chambers.



B.—Elevation and Plan.

certain strength, which is determined by a Beaume hydrometer, the cooling water is turned off and steam turned in. By the heat the carbonate of ammonia is eliminated in form of vapors which are led point of the bottom of the chambers an earthenware pipe is arranged which dips in a catchpot, also made of earthenware, and in which the drippage, which is a saturated solution of carbonate of ammonia,

is caught. Furthermore, there a steam coil is provided on the bottom of each chamber, which is used to re evaporate the salt (left on the bottom) which could not be used very well.

The product, which is gained in applying this process can almost all be used as a salable material. Of course, it must be sublimed also, and a very simple apparatus is used to perform this. The product which is taken from the lead chambers is brought into cast iron cylinders of about 2 feet 6 inches diameter and 3 feet 6 inches height. Each cylinder has a lead bell on top and 3 cylinders usually are put together in a water bath. By heating the water the carbonate of ammonia sublimes and forms a crust in the lead bells; after 7 or 8 days of heating, the latter are taken off and the sublimed carbonate of ammonia is taken out in lumps, which are ground in a porcelain lined ball mill to any desired fineness.

For a daily production of 600 pounds ammonia carbonate about 200 pounds of dry ammonia and 400 pounds of liquid carbonic acid are required. There are two kinds of salt in the market, one containing about 25 per cent., the other about 30 per cent. NH_3.

Concluding, I give a table, showing the specific gravity and percentage of carbonate of ammonia in solutions:

Specific Gravity 15° Cels.	Percentage of Carbonate of Ammonia.	Factor of Correction for 1° C.	Specific Gravity 15° Cels.	Percentage of Carbonate of Ammonia.	Factor of Correction for 1° C.
1.005	1.66	0.0002	1.080	23.78	0.0006
1.010	3.18	0.0002	1.085	25.31	0.0006
1.015	4.60	0.0003	1.090	26.82	0.0007
1.020	6.04	0.0003	1.095	28.33	0.0007
1.025	7.49	0.0003	1.100	29.93	0.0007
1.030	8.93	0.0004	1.105	31.77	0.0007
1.035	10.35	0.0004	1.110	33.45	0.0007
1.040	11.86	0.0004	1.115	35.08	0.0007
1.045	13.36	0.0005	1.120	36.88	0 0007
1.050	14.83	0.0005	1.125	38.71	0.0007
1.055	16.16	0.0005	1.130	40.34	0.0007
1.060	17.70	0.0005	1.135	42.20	0.0007
1.065	19.18	0.0005	1.140	44.29	0.0007
1.070	20.70	0.0005	1.145	44.90	0.0007
1.075	22.25	0.0006			

Segregation of Gas and Commercial Accounting.

[Prepared by MR. ERNEST F. LLOYD, Nineteenth Meeting, Michigan Gas Association.]

In speaking to you to-day upon the "Segregation of the Gas and Commercial Accounting of Gas Companies doing a Merchandising Business," I am afraid your President will feel that I have taken much liberty with his subject. For it is not my purpose to enter into any details of such accountancy; but rather to suggest for your consideration an analysis of the underlying elements of being of the modern gas company; to discuss its growth from its original simple character to its present essential complexity, and to point out the influence which comprehensive segregation of accounting may be expected to exert in any proper determination of equitable relations between the public and a public service corporation – more particularly a gas company.

Precedent and Custom.—Precedent is our most powerful and arbitrary law giver, custom is precedent's bailiff. Now precedent has decreed that a gas company is *only* a public service corporation, and custom that its revenues shall be thrown all into one pot; while much specious talk has well nigh convinced the public that the shareholders shall draw from the pot no more than common interest and that the mere possession of a franchise is in itself a guarantee of great earnings. And gas companies, while continuing to live within precedent's boundaries, have established many new activities without defying the bailiff.

To present the philosophy of this subject with some degree of adequacy, it seems necessary to carry you back to a time antedating the public service corporation in any form, to thereafter inquire into the gas company's original function, whence we will step to the present to find it, what for lack of imagination I will term a quasi-public-service corporation.

The Individual and the Highway.—Many moons ago precedent established that the individual might take title to land in fee simple; but so that every man should not be confined to his own land there were certain parts thereof, yclept the King's Highway, reserved for the common use of all. In due course his majesty graciously vested his rights in the constituted authorities, otherwise the modern public.

Now, for so long as the public retains jurisdiction over the highway, the surface is free to whomsoever may choose to travel thereon, provided only that he observe the public rules for such use. But this right is essentially transient, personal and individual. It involves no privileges to interfere with the roadway itself, and it ceases when the individual has personally passed. A man may drive properly without limit over the surface of the road, but he may not leave his wagon to obstruct the passage of others.

The Company and the Highway.—The gas company, on the other hand, requires for distribution, *i. e.*, conveyance of its product to the individual citizen of the public, a practically permanent occupancy of the highway, with a reasonable right to disturb its surface, and theoretically to obstruct travel, and to in other ways, within prescribed measure, exercise that eminent domain possessed in other respects only by the public itself. Wherefore, being a private corporation, yet partaking of public functions, the first gas company became, through this occupancy, and through it only, a quasi-public body.

It is extremely important for us to note this particularly, for it was at this point that a precedent was established. That precedent lay in the custom of supplying gas only—of engaging in no voluntary collateral activities and in regarding the accompanying products as undesirable encumbrances in their very terms by-products, something aside; and residuals, something left over; all too necessarily true possibly in the early days of the business.

The Company and Manufacture.—Thus, having found that the quasi-public powers of the gas company pertained only to the occupancy of the highway, we come to the consideration of the next step established by precedent and which the distances separating gas using centers of population made of easy and natural enforcement by custom. For inasmuch as this right to occupy the streets would have been of no value without gas to distribute, and inasmuch as it was necessary that each company produce its own supply, there was lost to sight the fact that the manufacture of gas upon private property was not a matter over which the public either did or could exercise any specific authority, or any authority which could properly be in any manner bound up with the grant of the use of the highway.

For nearly a century gas companies thus confined themselves exclusively to the manufacture and distribution (I can hardly say *sale*) of gas, wherefore, questions incident to their own adolescence remained dormant and precedent became firmly entrenched.

The Breaking of Precedent.—But with the establishment of differential fuel gas rates and the advent of competition in the lighting business, arose the necessity of extensively supplying appliances, of undertaking their installation and care and of realizing more than a residual value for by-products.

Thus escaped from Pandora's box new conceptions of a gas company's prerogatives, which I believe will eventually cause all such companies to be regarded, let me again say, as quasi-public-service corporations; in other words, as private corporations giving partly a publicly controlled, and partly a wholly voluntary private service, while yet exercising a measurable degree of public function.

To place this before you perhaps more concretely, I conceive that a gas company, having a franchise or contractual right for the use of the highways, might not itself be possessed of any means of gas manufacture, but might purchase all of its supply of gas from a private corporation delivering the gas to it at the street line of its works.

Co-related Functions.—On the other hand, good business would prohibit, and public equity would undoubtedly have a right to demand, that such a segregation should not be permitted to oppressive limits. For instance, it would not be within the limits of equity for a gas company to sell out its manufacturing department to a separate corporation composed perhaps of precisely the same stockholders in the same holdings, which secondary corporation would manufacture the gas and then charge the first corporation holding the franchise such an exorbitant price for gas as would necessitate unjust rates. Probably the law of conspiracy could be successfully invoked against such an attempt, certainly the law of competition would be. And if a gas company, therefore, manufacture its own gas, we then find there are certain natural credits accruing in reduction of the cost of the gas, and which credits are the unavoidable by-products, as coke, tar, etc. But at what price should these by-products be credited to the cost of gas? Should the cost of the retail sale of them in advertising, solicitation, delivery, collection, bad debts, etc., be charged against the gas operation, and the net returns therefrom credited to the cost of gas in the holder, as has been substantially the custom established by precedent; or should they be treated in a wholly different manner?

True Residual Credits.—The question brings us at once to the fundamental difference between the existing and a new system of ac-

counting, and face-to-face with whether or no we shall defy custom in the interests of progress. Let us argue with custom from the two standpoints of accuracy and justice.

In respect of accuracy. The price of tar, of ammonia, and of coke fluctuates with the ordinary laws of supply and demand, and in a manner wholly unrelated to any fluctuations in the price of coal or of labor. Thus, over a series of years, these fluctuations introduce variable multipliers of the several factors entering into the totals of the cost of production. Obviously, then, as a method, it leads to inaccuracy.

Then as to justice. What is the true credit to be given to the "Gas Operations" through the unavoidable production of accompanying products? In my opinion and practice it is the wholesale price of those products in the company's yard or on tracks—such price as would be paid by any purchaser who would undertake to remove the total product as and in the condition produced, and whether he had immediate use for it or not. Any advance in price, obtained by any manipulation, rectification, refinement, or demand created by the efforts of the company, is not a factor of the gas company's operations as a public service corporation. And if this be true of so intimate a detail as the so-called residuals, how much more emphatically so is it of all those dealings taking place under the head of the usual "New Business Department."

Applied Segregation.—To realize this in my own practice, under a single corporate head we have two departments, one "Gas Operations," the other "Merchandizing Operations," and for the latter have established a surplus derived from this trading and approximately equal the value of the merchandizing and coke stocks and accounts carried, thereby in effect establishing a like condition to that which would confront a separate organization purchasing the coke as manufactured and carrying on the other voluntary merchandizing activities of the company.

Against this "Merchandizing Operations" department of the business, therefore, is charged, each under its individual accounting, all the cost of coke at a price which year-by-year it is estimated would be the obtainable wholesale price from a contractor for the entire product in the yard. To that debit is added all the cost of advertising, soliciting, billing, collections, bad debts, office rent, and the multitudinous other charges that would confront the ordinary retail coal dealer. To that account is credited the value of the product sold at the selling price. Similarly do we segregate and account for all such work as the selling of appliances of all kinds, the installation of house piping, lamp maintenance, etc., all in the same manner and to the same extent, as closely as it can be segregated, as would apply if a business of selling, installing and maintaining appliances were being independently conducted. In practice this careful and complete segregation has been found to remove completely any temptation to ordinarily sell such appliances at less than a fair profit.

The Argument for Segregation.—For it is no part of a gas company's contractual obligation to the public that it employ the selling talent and undertake the cost necessary to show the advantages of coke for fuel in such manner as to create a profitable retail demand. It is no part likewise of this obligation that it sell a stove or a lamp, or pipe a house. If, then, the merchandizing operations lay no burden upon the gas operations, and are an activity which the company is not under any contractual obligation to furnish the public, then it is unjust that the profits therefrom should be considered a part of the measurably insured profits of the business due to the monopolistic grant of the use of the highway. Or that they should be taken into consideration in determining the allowable return upon the investment employed in the furnishing of gas, which is alone the basis of the grant.

Still further. There is no stability to the prices at which it may be necessary to sell any of these products or appliances in competition in the open market. There is no protection to the company through its contract with the public that it shall secure an adequate return thereon. The laws of supply, of demand and of successful competition are operative against the company in the handling of these departments, to as great an extent and in all respects, as severely as against the private trader. Their conduct involves none of the capital involved in the making and delivering of gas. Consequently they have no proper place as an element in fixing rates at which gas should be supplied.

Again, as condemning existing methods, when the profits accruing from the retailing of coke and the selling of other merchandize are all credited to a general loss and gain account, and dividends are paid regardless of their source, the foundation is at once laid for possible charge of excessive return on a monopolistic investment. And still again, when a company so conducted has to apply for an extension or continuance of its powers, or face a demand for revision of rates, it may find itself compelled to establish prices for gas, in no small part based on the unsecured and unstable profits derived from these voluntary activities.

If intelligent, complete and accurate segregation has not been practiced as a matter of basic policy, it is hardly to be asked that the public will then give much consideration to the propriety of a pro-procedure which the company had itself theretofore ignored. If, on the other hand, these two fundamentally different elements of a gas company's responsibility and opportunity have been honestly accounted for separately, and dividends have been paid separately as specifically derived from each source, and the respective surplus earnings have been kept apart, the burden of proof will be the other way. So much then for the obviously immediate or direct results of segregated accounting.

Segregation and Service.—There is also another element of, or perhaps more correctly a collateral aspect to this subject, one of the most subtle and difficult to treat, in the determination of which segregation may materially assist, even if it may not be claimed that it will supply a solution. I refer to that rather intangible, entirely voluntary, somewhat elusive, yet very certain value rendered the consumer, as a resultant profit to the company, that product of brains, energy, tact and general appreciation of the widest possibilities of the business and the means for the attainment thereof, that personality which has come to be classified under the generic term—Service. Service, therefore, is not adequate work, mains or meters. Service is not gas, even of good quality and sufficient pressure. Service, in other words, is not something physical, despite the fact that these adequate physical attributes are necessary elements of good service. In a private business, under the name goodwill, it is recognized as an intangible element of the highest value. If, then, service be a definite value rendered the consumer, and if it be a voluntarily supplied value, then the company supplying it is entitled to a return of the cost of service plus a profit on that cost, wholly regardless of a profitable return on the investment required to supply gas.

I fully grant the practical difficulties in the way of an equitable solution of a problem wherein a contractual and a voluntary element, each bearing to the other a most intimate relationship, must be paid for by a single price measured in terms of one of the elements. And particularly so where custom has ignored the existence of a voluntary element, and the company, under existing methods, has no suitable accounting for showing its extent with reasonable clearness. It being part of my purpose, however, to present the bearing of segregation on the intricacies of this problem, let me endeavor to elucidate it somewhat through the medium of an extreme comparison.

Let us assume two towns of substantially equal population, similar habits and comparative purchasing power. Let us further assume a substantially equal mileage of mains, and other physical value of plant and equipment. Let us assume that gas is made by the same process from similar materials with equal intelligence, and that in each place the consumer has always an adequate supply of a uniform and equal quality at the same price, and lastly, to give our comparison a possibly practical object, let us assume that these two towns are located in the same State and under a State commission, that each of them is carrying its accounting in the ordinary way, one of them paying dividends of 6 per cent. and the other 12 per cent., on actually invested capital, and the commission is confronted with a demand that the rates be cut in the second town because of exorbitant earnings. Let us inquire as to what may be the difference in the conduct of these two businesses.

A Public Service Corporation.—In the first town, let us find a thoroughly capable, technical management, which, as we have before assumed, supplies an adequate quantity and proper quality of gas; but that there its conception of its business ceases. It maintains no showroom and exhibits no appliances. It has no solicitors and no trouble men. It collects its money, or cuts off its delinquents.

And if Mrs. Percival Smythe calls at the office to say that her new aluminum kettle is getting sooty, she is referred to the dealer who sold her the stove, or to a plumber; for, the gas having passed the meter, it has been supplied for a stipulated consideration, has become the property of Mrs. Smythe, and its further use or abuse is not the concern of the gas company. This, happily, is perhaps a too fantastic example, yet there are those who can remember the time when it would have been less fantastic than it is now. Mrs. Percival Smythe, mentally scoring one against the gas company, thereupon telephones

Wm. Plumber. Maybe that day or the next "Tom" Plumber drops in, and at the expenditure of an hour going and coming, and 15 minutes in the house, cleans out the clogged burner, that the kettle may resume its erstwhile pristine brightness. For all of which Mr. Smythe is duly rendered a charge, not only for "Tom's" time, but for a substantial margin of profit that accrues to "Tom's" employer. Now what is the cost of gas per 1,000 feet to Mrs. Percival Smythe? Obviously, the price she paid the gas company, plus Wm. Plumber's bill. And so if it were a blackened mantle, a stopped tip, a leak, or any of the other hundred-and-one troubles for which the gas company may not be in any wise responsible, but which are yet very real impairments of the service to the consumer, are usually classified under that most erroneous title—complaints—and most seriously affect the consumption and the resultant profits.

A Quasi Public Service Corporation.—Now, what is the practice in the second company, against which lies the charge of excessive dividends. Let us find them in a large and commodious uptown office, in the convenient but expensive center of the shopping district, with everything in the way of devices for utilizing gas on exhibition and sale. Let us find a branch telephone exchange presided over by a polite and intelligent operator (not cheap attributes, those!) and a sufficient force willing and able to give every need prompt, efficient and courteous attention. Moreover, we find not a house in town but receives a call at least every 90 days from a young man or a young woman whose only aim in life appears to be either to find out if there is anything the company can do for the occupants, or to get a reason why they are not using gas. Is this picture altogether a fantasy?

Yet, notwithstanding all this, Mrs. Reginald Browne finds her kettle also getting sooty and likewise her first thought for remedy is the gas company and she telephones the gas office. Before Mrs. Reginald Browne wants to use that kettle again a man has appeared at her house, the cause of the trouble is remedied, and Mr. Browne owes no bill to Wm. Plumber.

Does the assertion that the sales of gas will be 2, 3 or 4 times as much in the second town as in the first need any demonstration? And, accepting the difference as a fact, why is it, and to what is it due?

It is not my purpose to inquire whether the State Commission, in passing upon this case, should say whether a progressive management supplying gas and service should be allowed no incentive to give the service; or whether they should be entitled to a proper profit on the *working expense*, the personality, voluntarily invested in their energy, acumen and labor, and you will ask, therefore, what has segregation of accounting to do with the case.

Segregation Exemplified.—Simply this. Where a single organization is carrying on, with a mixed force, two or more separate, yet intimately related, activities, it is necessary, in order to properly and completely ascertain and apportion the elements of each, that an analytical accounting of every element of cost be continuously maintained.

Take, for example, a solicitor in an ordinary company, and, what may be the detail comprising the sum total of his daily work. He waited on Mrs. Jones at the office to show her a stove. He must call on Rogers to get his order for next winter's coke. He must stop at Williams' house in passing, because Williams is a prospect. Maybe he is the first man at hand to fix Mrs. Browne's stove. Incidentally he took a few pick-up meter readings, explained to Jones' satisfactorily why his bill was a half more than last month, and waited 20 minutes to catch Green to find out when his new house would be ready for that piping order.

Now what are you going to do with the $2.50 paid out for that day's work? Are you going to throw it into "expense" and hope the offsets will find their devious way to the other side of the account by the end of the year? Or are you going to look at it in a more analytical light? In that day's work was time employed on straight merchandizing—"Ranges" and "Coke Sales," just the same kind of solicitation to effect a sale for profit as would be put in by a hardware dealer, ditto by a coal dealer. There was some "Gratuitous Expense," *vide*, Mrs. Reginald Browne. There was some "Development," or work put in to assure future extension of the business, *vide*, the Williams call, and waiting for Green about his prospective job of house piping. There was some straight "Meter Reading," a detail of distribution expense. There was some plain gas expense, *vide*, adjusting the high bill.

And in contradistinction to the diversified activities of the general utility man thus described, we will find our way through varying degrees of divided effort to, let us say, a stoker, against whose work there is but one division month after month.

Now, to segregate with honesty and accuracy, every minute of every man on the force must be accounted for. It sounds like a big proposition, in reality, it is a simple matter of detail, and why should it not be segregated? If you are paying a man 25 cents an hour, 10 minutes times is worth a trifle less than 5 cents. Your $100 bookkeeper may spend all day hunting for a 1 cent error in his trial balance. Why should you disregard 10 minutes of time?

And a Possible Result.—But passing that, wherein will segregation help you with your commission and your fight?

First, if my theory be correct, your merchandizing profits of all sorts are eliminated from consideration. So you will, by segregation, eliminate from the sphere of proper public regulation a not inconsiderable proportion of your legitimate dividends.

Second, if, under suitable titles, your segregated accounting comprehensively provides for the details of the voluntary expense comprising the cost of fixing Mrs. Browne's stove, the rent of the well appointed office in an expensive locality; the extra salary to a manager possessing more ability than mere competence, and other proper elements of the expense involved in the effort to give perfect service, will you not then be in position to take the ground that these voluntary expenditures are not a part of your contract for the use of the highway, that they are your own voluntary private efforts in service to the public, for the good of the public, and for your own resultant additional profit, and that you are properly entitled to a return, both upon the investment necessary to make and supply gas, and upon the voluntary expenditure that produces this extra profit?

[Official Report.—Continued from Page 439.]

SIXTH ANNUAL MEETING, IOWA DISTRICT GAS ASSOCIATION.

Held at Sioux City, Iowa—June 15-17, 1910.

Second Day—Afternoon Session.

The President introduced Mr. J. E. Shuff, who read a paper entitled

HOW WE INCREASED OUR GAS SALES IN LINCOLN.

[For the text of the Shuff paper, see Journal, July 18, p. 107.]

Discussion.

Mr. Grey—There are one or two points that I would like to ask about in connection with the demonstrating of appliances in the office. The gentleman mentioned the operation of gas engines or mangles or the baking of cakes being carried on in the office. Do they employ a demonstrator to follow up their new range sets and look after appliances of that nature? We always found that a very important part in selling appliances. He also speaks of requiring daily reports from the solicitors, giving the number of calls made, names of parties called on, and, of course, the sales. I would like to ask if he operates a card index on the different consumers in his city and what success he has had in that direction. I did not quite understand what he meant by offering a small number of points on meter applications, and would like to have that explained. I think it is a good idea to offer a bonus of some kind for every dead service that is revived, but, as I understand it, that is not their method. Increasing gas sales would seem to indicate that we increase the territory supplied. Of course, in the older towns this would necessarily be limited, although it makes the point more alluring to the solicitor; but, on account of this limitation, we will have to look to other methods to increase our sales. I think the most potent factor in increasing our sales is to be able to furnish good service, which does not necessarily mean the ability of the manufacturing department only to furnish a good quality of gas. It needs the co-operation of the commercial and business department with an efficient sales force to thoroughly keep in touch with all our customers, and the distribution department to properly apply the gas and correct pressures, if necessary, for the efficient operation of the appliances. We should also promptly attend to complaints of customers and show them that their interest is ours, and, within a very reasonable time, take care of all orders that may be given; but I think that good service cannot be too greatly emphasized.

The President—I was showing a gentlemen through our office recently, and pointed to a railed off section which I told him was the new business department. One of the solicitors overheard me and said, "This is the backbone of the gas company." I think we would like to hear more from the backbone of the gas company on this subject; for I believe not one-half has been told. I always had the impression, from what I have heard of the commercial end of the business, that they were the only live ones in the bunch, and I think this is the opportunity to tell the ignorant ones how to increase gas sales. This paper was prepared with the idea of benefiting companies who have no soliciting department, where the manager is the solicitor. I don't believe they should let this opportunity go by, and, as an engineer and technical man, I challenge the commercial men to respond to this paper.

Mr. Crady—The way we handle our solicitors with the card system is to take daily cards right from the order counter, after being sorted up as they come from the shop. We match up our original cards, which come up from the shop with a duplicate card that is held at the office. After being matched up they are run through the solicitor's house-to-house canvass, first, and notations made as to ranges set, meter turned on or shut off, and work our solic tors from those cards. I insist upon their having those. If we get orders for new sets that are connected with ranges, or water heaters added, or rooms piped, they are added right to the house card which we have on that street number. Another little idea that might be used and which we consider quite good business, is a printed folder denominated "Tips on Gas," one of which is handed to each new consumer or to anyone we think does not understand how to read his meter. It gives a diagram and explanation of reading the meter, and also sets out the discount; at the bottom we do a little advertising.

Mr. Mettler—Mr. President, I am going to try to help the new business men out all I can—I have attended a good many gas conventions, and I never heard this particular point brought out. I believe the new business departments of the gas companies should cultivate the acquaintance of the architects, so that they would do as I saw done 2 weeks ago. An architect with his client walked into the office of the gas company and asked the manager of the new business department to inform his client what he ought to have in his

house to give him satisfactory gas service, and he would specify whatever they agreed on. Now, this would be an excellent policy for every gas company to follow out. By this means you will get right at the bottom of things and induce consumers to use nothing but the best gas appliances, having those properly installed through the architect.

Mr. Grey—I think the greatest help we can have in the new business department is to have a distribution department that will give good service; that is a great deal more important than any number of solicitors. I think we will all agree that we will get better results from that than anything else, and it has to be taken into account with all new business departments. I think what Mr. Mettler said about the architects may have been overlooked to a certain extent, but it is being taken notice of at this time in a great many places We recently appointed a man in Omaha to look after this work entirely, and his duties consist chiefly in seeing the architects and the builders of every new building that is being put up in the city to find out exactly what appliances are to be put in the building, whether it is to be piped or wired, getting all the information possible and making all the suggestions we can on the new building work.

Mr. Hanson—I came from Council Bluffs to learn and not to take part in the discussion, but I can't keep still very well any longer. I am a new man at the business, yet I may be able to tell you some things that might be of benefit to some of you older men here. I have arranged with the building inspector by which once a day we get reports of every permit taken out, and we follow that up and see the owner of the place. Of course, we have both gas and electric lights, and as yet we have been successful in getting them either to pipe or wire. In most cases to have them put in combination fixtures. We started some time ago a house-to-house canvass. We are going to have a card index system and know what every consumer has. The first of every month, when we send out our statements, we inclose a small advertisement therewith, and you would be surprised at the calls for those things that we advertise. It doesn't cost anything except putting it in the envelope; we can get plenty of advertising matter free of charge. As far as complaints are concerned, I think the new business man is the proper one to take them up. I had a little experience last week with a party living in Council Bluffs who owns considerable property and has an office in Omaha. Somehow or other he rented the upper floor of one of his buildings to a milliner with the understanding that he was to put in gas. I was out for a couple of days, and when I came back the pipe men were wrangling about it, and he had ordered the gas taken out of his house and bought two oil stoves. I went over to Omaha to see him, and in about ½ hour, when I left him, we were the best of friends, and he sent a letter canceling his order for the oil stoves saying he was going to continue to use gas. It was just a misunderstanding, and the men in the office don't seem to take the interest that the new business does in those things. For such reason I think all complaints should be turned over to that department, and, if there is anything wrong with the meter, send out to find what is the trouble, and the same with any other complaint.

Mr. Chubb—I think, as Mr. Grey and others have said, that the new business department depends a great deal on the shop force, and that if the shop force is falling behind or lax it is not entirely their fault. It has been my practice, when an order comes into the office and is taken care of by the order clerk, to have him write down on a little card what is wanted, when there isn't room to put notes on the order, thence it goes to the shop and is taken care of with the other orders. It may be the few orders I take personally—my people sometimes call up for me personally—are just the orders that require notes, yet I don't make out 1 order in 10, but have to turn to the back and put a note on it. When I go home I am going to have new and larger order blanks made out, so that the order clerk can put on everything necessary,so as to help out the shop department as much as possible.

Mr. Fair—I merely want to emphasize the great value of the card index referred to, especially for the small companies. I think possibly the managers of the smaller companies have thought they knew all their customers personally, and knew they were using the gas, and thought it was not worth while for them to have a card index, such as has proven so successful with the larger companies. It has been my experience that the time and very slight expense entailed in getting up a complete card index are well worth while. I recently became interested in a very small company, and one of the first things we did was to have a man call on every consumer and fill out the card which supplied us with information as to the number, size and character of the meter, the size of the service, make of range on the premises, whether it was single or double oven, and size of the oven; the same for water heaters and hot plates. If they were using gas for illumination, the make of incandescent burners and the number on the premises. That information was most valuable. On my consumers' ledger sheets I have a top column on which this information, in a very condensed and abbreviated form, is noted: Whether they have a single or double oven range, a single burner or 2-burner hot plate, a circulating or instantaneous water heater; if, it is a business house, how many inside arcs or outdoor arcs on the meter. So that when we are going through the ledger and note the size of the monthly bill, we know at a glance what that meter is supplying and can gauge the bill accordingly. I think if the smaller companies would have this record (which, of course, is in the mind of the manager) in black-and-white in the office, it would prove of great value.

Mr. Mathews—Like the gentleman from Council Bluffs, I came here to learn more than to teach, but I thoroughly agree with what Mr. Fair has said in regard to the card index. I have a card index on my desk of every prospect along our mains, and make it a point, about twice a month, to write to each of these prospects a personal letter. In the first letter I talk to them a little about a gas range; in the next letter I write to tell them about water heaters, and keep on in that way. We put a light free into every kitchen where we set a range, and make that one of our talking points. We have been operating only about 8 months, have 800-odd consumers, and our output averages about 25,000 cubic feet per day. So I think the card index and the follow-up system are the biggest things in the advertising line that we can find.

The President - What is the population of your city?

Mr Mathews—We hope our census will show 6,000; I don't think it will, but it should be 5,500.

Mr. Mitchell—I want to heartily indorse all that has been said about good service and operation and distribution department, and also the office department working on gas sales. It doesn't make any difference how many appliances we sell; if they are not properly adjusted it doesn't do much good to sell them. I think one active point has not been brought up. We have a circular letter that is sent to every meter application coming to the office, whether a new or old consumer. This letter sets forth the claims of gas for fuel, water heating and lighting, and any new appliances that we may have in the gas line. We think it helps, because it lets the people know that we have an interest in them when they make an application for gas. When the company is larger, oftentimes the consumers think the company takes no interest in them, and if they get a letter it helps a good deal.

Mr. Clabaugh—I didn't mean to say anything on this paper, Mr. President, but you have challenged the commercial men, of whom I am one, and I look upon the technical man as a necessary adjunct only to the commercial department. I have been very much interested in what has been said here, particularly in what Mr. Fair said. But one of the most important features from the commercial standpoint has not been brought out (at least I have not heard it from the solicitor) is the illumination feature. Everybody is talking about appliances, gas stoves, water heaters, cookers—all kinds of things. They are absolute necessities and we have no competition on them. No one is going to use an oil stove. The electric companies cannot compete with us. It is a very easy matter to convince all that they should cook with gas. I have nothing to say about gas for power, but practically all the other appliances that are on the market to-day are absolute necessities; but in order to keep up your peak load every day in the year, practically at the same time in the day, you will have to look after the illuminating end, because the electric companies are working hard against you. We have one of the greatest talking points in the world, not only as to economy but as to efficiency, in gas, in competition with electricity. We had it all demonstrated here this morning. The gentleman who read the paper spoke of his solicitors not paying much attention to getting meter applications; there wasn't much in it to them. They would rather sell gas stoves, because they got more. What is the use of selling gas ranges if you don't have a meter in the house? When the solicitor gets an application from a consumer there is the greatest opportunity in the world for him to talk his appliances for heating or lighting; but how many do it? Mrs. Jones telephones down to the office that she would like to put in gas. Just think what opportunity the solicitor has in seeing Mrs. Jones and talking to her of the advantages of gas! But I have noticed that solicitors did not want to be given applications; nothing in it; no points. Well, I am going to tell you, gentlemen, it is the entree into a house that is the very first and most important point to every salesman. I want to impress that upon the younger men who are coming on, because they all believe in the sale of gas for all the uses for which it is prescribed. They all believe in it thoroughly. A very important factor with which to start is that a man has something in which he believes; a company that he knows is going to stand behind him. What better talking point can he have? Some years ago I sold gas, and the most important point in my whole salesmanship was to satisfy my consumer, so that when I went there again I got good treatment. Be honest; tell the truth. If a burner will burn 5 feet an hour, don't say it burns a little over 4—4 or 5 means nothing to him practically; but when his bill comes in and he figures it up, and it has not burned over 4½ feet, he will say: "That solicitor is all right; he told the truth." The man who is honest and absolutely square in every statement that he makes to his prospective or new consumer, has won his consumer's confidence, and without it no salesman can succeed.

Mr. Addy—I don't know that I have anything special to suggest, for our problems in Waterloo might not be those that happen in other places. Whenever we run a new main we make it a point, among other things, to try to get an order for a gas range from the occupants of every house on that line. We tell the people that we don't consider a man a new consumer until he has agreed to buy a range. If one of our real estate men, who is anxious to have a main run into an addition that he is planning to the city, speaks about his addition, we tell him that we can't consider any house or prospective customer unless that house is piped complete, so they will not only cook with gas, but use the gas in any way that they may wish in any part of the house. We try to keep a record of our idle services. I think that has been spoken of, however, several times, so it is hardly necessary for me to emphasize that point. Also, the seeing of architects and plumbers has been mentioned here. I think both of those points important. In our case we put a little "ad." on the end of our gas bills each month. We have the bills made a little bigger than is neces-

sary for the bill proper, and on a small stub at the end we print an advertisement of any point we wish to impress upon the people, especially at that time.

Mr. Adams—I graduated some time ago from the engineering end of the business into the commercial, and have taken a step forward. Mr. Clabaugh says we ought not to overlook the lighting feature. He is absolutely right, and I can produce a little evidence. In Fremont, a town of 10,000 people, 6 months ago they had only 400 residence consumers. The people using gas did so because they had moved from some other place where they were accustomed to it into Fremont. In a town adjacent to Lincoln, where they had no gas, there were 40 houses piped, simply because they were near a city that was using gas for illuminating purposes. Another little town, 5 miles from Lincoln, with electricity at 10 cents, had 11 users of gas. I think 40 per cent. of our gas output is for lighting. Our number of gas consumers is twice the combined number of consumers in the electric and traction department of the company. You can get that lighting business; it is not an impossibility. You should not be afraid to go after it, and with a storage holder you can handle it. It simply means a few dollars invested in a holder.

Mr. Burt—I think the technical department has had a body blow here. I don't know whether the last speaker was jealous or what, but if, only for the sake of upholding the technical department, I wish to say that I don't know how the commercial department would get along without it. I am firmly of the opinion that both departments must work entirely in harmony, and neither one be put over the other. I believe there are parts of the commercial department that belong to the technical department; on the other hand, there are parts of the technical department belonging to the commercial. A man can be a better commercial man if he knows something of the technical side of the business, and *vice versa*. The other day I was in a haberdasher's, and a gentleman came in and stood alongside of me and asked to see a dress suit tie. On the end of the tie shown him there were a couple of peculiar bars, and he said he didn't want that; but the salesman said to him, "That is just what you want; that is the proper thing," and he bought the tie. The point is that he convinced the man that he knew what he wanted, and the man didn't. If you have convinced yourself that you have a good thing, and know that the other man wants it, you can almost invariably sell the article.

Mr. Clabaugh—That absolutely proves what Mr. Burt said here. Had the manufacturer not manufactured that cravat, knowing that that man did want it, that salesman never would have sold it. So they work together, and they necessarily should.

The President—From the remarks I have heard, the commercial department seems to think that the new business is dependent practically entirely upon the fitting or shop department to land the business for them. I would like to hear from some of the shop or distribution department men as to any criticisms they may have in regard to orders that they receive—whether they are in good shape and intelligent orders, or whether they are so that a man can tell whether the work is to be done promptly and certain promises have been made. Mr. Johnson, can you throw some light on that question as to whether your orders come in in the way you think they should; and, if not, as to how they should come in?

Mr. Johnson—My experience has been that our orders have been different from the ideas that have been conveyed to the sellers. Of course, if our men are instructed by that order, and the consumer asks for something that is not written on the order, of course, a little bad feeling is created toward the company through not complying with their wishes. Although some of the requests may be minor, they are not able to distinguish what they should and what they should not do. I believe some of the orders are written in as few words as possible, and especially in the system that we employ at Omaha in our fitting department of making general delivery—that is, according to general schedules—for a certain size of job to be done, it is impossible to regulate this unless the order is properly given. Sometimes it seems that the promise has been made to the consumer in a verbal way and has been misunderstood by him, and, of course, this is blamed to the fitting department. If the promises are contrary to the rules of good gasfitting, we can't comply with them, although if the solicitor had not understood the matter it is not his mistake.

Mr. Bertke—We try to have our fitting and order departments work closely together. We made up a certain schedule of when the shop department will do certain classes of work. For instance, complaints, meter sets, and other orders of that nature, are taken care of very promptly; the very next day, provided the orders are taken before 4 o'clock in the afternoon. Delivering an appliance and setting it depend upon whether the run is in or not. If the run is not in, we have a limit of 3 days to deliver and connect with line. If, however, customers are very anxious for certain reasons to be connected up previous to the time limit, the order clerk in the complaint department can make the provisional promise that it will be done on a certain day, and he takes it up with the shop department; and promises of that character are taken care of. So that in no way do we want to give a promise that we cannot fulfill, and we find that by following that system we have very little trouble. If occasions arise where the order is not explicit enough, and there is a question as to exactly what is to be done, we have very handy 'phone connections, and those things are looked into before the order is sent out of the shop.

The President—The Western Union Telegraph Company, and I think the Postal Telegraph Company, will accommodate their regular patrons by rushing a message through in advance of other messages, provided it is important; and the system that they use is to pin a pink ticket to the telegram. If you go to the telegraph office, wishing to send a message and have it get off promptly, if you will just say, "Pin a pink ticket to this" (don't work that too hard), and you are a regular patron of the telegraph company, they will attend to it. In Omaha we adopted this pink-ticket scheme, but unfortunately being worked too hard it didn't give the emphasis that it should. Having been able to convince them of that fact, now it is working very satisfactorily. We pin a pink ticket to important rush orders, and these have precedence over orders that have not the pink mark. I merely throw that out as a suggestion. It is very simple; you don't have to have a different card. Just pin a little pink ticket to it, which can be detached when the work is finished.

Mr. Burt—I have a story that I wish to get off before we close this discussion that has a bearing on this matter of new business. It has been said quite a number of times that a satisfied consumer is the best asset of a gas company. I call to mind the story of a lady in a New York hotel who came down to the desk one day in great distress and said there was a mouse in her room. The clerk told her that it was absolutely impossible for a mouse to be in the room; that it was a fireproof structure and a mouse couldn't possibly get in. But she insisted a mouse was there, and got very indignant because the clerk denied that it could be so. In high dudgeon she returned to her room, packed up her duds and started to leave the hotel. The manager met her, asked what the trouble was, and she replied that the clerk had insulted her when she told him there was a mouse in her room. He said, "Certainly, there is a mouse in the room." He got his force together, cleaned out the room, and convinced her the mouse was all taken care of. Then she became satisfied, went back to the room and it was all right.

The President—I don't believe the New Business Department is the only salesman of a gas company. I believe everybody connected with the gas business is a salesman; and because I am not in the new business department don't think for one minute that I am not a salesman. I try to sell as much goods as the men in the new business department and I try to teach the men under me in the engineering department that very fact. Even the man who operates the boilers should feel that he is selling goods, and the office boy and everybody connected with the business should be a salesman. Sheldon, with whom all of you are familiar, says there is no man in America making a living that is not a salesman, or should be, and I believe that that applies to the gas business; that every man, through the remarks that he makes to the public in connection with the business, will either queer a sale or help it; and whether he is on duty or off duty he should bear in mind at all times that he is a salesman. I don't believe we ought to look to the new business department to make all the sales, but that we should help them. They can get all the credit if they want it, but every man who draws a salary is a stockholder in his company. We are all salesmen and we all should work together. That is the one great secret of success in the public service business.

Mr. Borden—I rise in corroboration of what has been said for the benefit of other small plants. We have a ticket which carries prospective information that is used entirely in our shop. We have no a large shop force at this time of the year; we have four men in it most of the time. We have not found it—I was going to say necessary—at any rate, we have not instituted any special remuneration, such as a bonus or anything of that sort to these men for filling out those prospective cards, but simply instilled into their minds that that is a part of their duty, as important as any other part of their work, to fill out those prospective cards wherever there is an opportunity, and they find a great many of them in the course of their travels around the streets; they are constantly filling out those cards. No matter how small or how large the appliance may be, or the light, or whatever it is, I always figure that the greater the number of prospective consumers the greater will be the number of consumers secured from the list. I make that prospective list just as large as I can and count on a certain proportion eventually being permanent business.

Mr. Mathews—Mr. President, in your last remark you suggested that each employee of the company was, in a certain light, a stockholder in it. I would like to know what idea some of those present have on the profit-sharing system; that is, paying a certain per cent. of the net earnings to each man who has been in the employ of the company for a year or more? As far as I am concerned, I believe it is about as well invested money as the gas man can set apart.

The President—Would that bear strictly on the subject of the paper? I am afraid we may get off the track if we start on that subject. We would get mixed up with labor problems and other things. I think we might better confine ourselves strictly as to how to increase gas sales. There is nothing else like competition. I believe nothing else has done more good for the gas business than electric light. Having heard from Mr. Mettler, I wonder if Mr. Crain could give us an idea as to how we can increase gas sales?

Mr. Crain—My work, as you, of course, all know, has been along the line of automatic water heaters, and they are the means of bringing in as great a revenue as any other class of appliance that a gas company can handle. Consequently it is a class of business that should be pushed as hard as possible in such localities and among the class of people who are able to afford such an appliance. It is not a machine that can be sold in every residence, but in every city (large or small) there are a great many places where such a heater could be used, and after a few machines have been installed it is much easier to get others interested. We always figure that one heater

sells one or two more, and I have found that where a man has purchased a heater, after it is installed he will get after his neighbors—people in the block immediately surrounding; so we send them a letter calling attention to the fact that Mr. John Smith has purchased a heater, and explaining what a novelty it is, he is asked to call and see it or ask Smith about it. We follow that up by calling on the man to inquire if he has seen the heater. That gives us an opportunity to go into his house or office, as the case may be, and get his attention. When a fellow has just purchased an appliance which is giving him unusually good service, he becomes enthusiastic and more inclined to talk and tell his friends and neighbors about it. He is proud of it, and will give you a very good selling talk, one which would have much more influence than any the salesman could give, and all the customers you can get to help boost count greatly. In selling an appliance, no matter what it is, the salesman should be careful not to place one unripe for the conditions under which you operate. If the customer has not gas, or there is some other peculiar condition that is not fitted for proper operation of the appliance, it should first be carefully gone over and considered. A water heater man dislikes very much to turn down an order, but I had to do this the other day after the apparatus was sold and in fact shipped. There was not gas available to operate it, and while it would have given some service, it would have been unsatisfactory service. I would rather lose an order than fill it and have trouble. The like is true with every other appliance. If for a great, big house, you sell a little range, it is going to be more bother than it is worth.

Mr. Burt—I take an exception to the proposition Mr. Clabaugh puts in reference to illumination. I believe that is the field of the electric department and think the heating field is the field of the gas department. I believe in those corporations that are of the combination type—electric current for lighting and gas for heating. I noticed Mr. Clabaugh left out the power business. Of course, at anything like illumination prices for gas, the gas engine cannot be a competitor of the electric motor, and I suppose that is the reason he left it out. Two years ago I felt almost certain that the electric lighting business would be put out of business by the inverted gas lamp, but the stimulus given to the electric business, by the inverted gas arc and gas lamp and the development of the tungsten lamp, has been very great, and there is no telling what will be developed along those lines by this back-and-forth competition to produce the highest illuminant. But I verily believe the field can be covered more thoroughly for gas in the heating and the electricity department in the lighting division.

Mr. Adams—If Mr. Burt will analyze his consumers, he will likely find that a large percentage of those are actually carried at a loss, in either his electric or gas department. Take one of these consumers carried at a loss and make him use all gas; he is not the loss that he would be if he were on both books. I say, when you get new consumers, try to get them on one service and one pressure.

Mr. Burt—My experience is that a consumer will pay a $3 gas bill and a $3 electric bill quicker than a $6 bill for both.

Mr. Adams—I do not agree with you on that.

Mr. Steinmuller—As to paying salesmen on the bonus basis, of course, that will not apply to the small plants; but I have had some experience in this line myself. I found it the easiest and most satisfactory method that we ever used, due to the fact that, in paying a man on a straight salary basis, he was satisfied if he secured a certain amount of business; whereas, if there were a small guaranteed salary and a bonus, he was never satisfied until he had the large end of the latter. Following up the remarks of Mr. Borden, as to the information card, I have also had occasion to use in an informal way a slip which we call an "Information Slip." Those words were printed across the top, the slips were padded, and at the bottom of these were the words: "This slip is to be used to note any information that may be of interest to the Company." Every person in the employ of the Company was supplied with a small pad of these slips, and we found that by properly impressing the importance of this slip, especially upon the fitting department, the men really considered it a pleasure to bring in tips on prospective sales for gas appliances. This slip is, of course, also used to note complaints coming under their observation which they were unable to handle, or possibly such things as leaks, etc., that might be discovered and not taken care of at the time, or that they were not able to care for.

Mr. Tenney—I have in mind an instance, in a small town in the eastern part of Hardin county, Ia., in which the gas company installed within the last year 114 inverted gas arcs. In going over the books with the City Clerk I found there had also been an increase of about 20 per cent. in the current sold in that same district in the same time, so the 114 gas arcs are simply items for an increase in the amount of illumination done in that district. In other words, competition has so stimulated trade and created an appetite for illumination that they have got in the habit of requiring a larger volume of the latter. In connection with what has already been stated I want to say there certainly must be co-operation in the operation of a gas plant, be it large or small, right from the generator door to the consumer's burner. You must, first, have good gas, well purified and delivered under good pressures, then you will have satisfied consumers.

Mr. Shuff—Mr. Grey asks about demonstrating in windows. We think that it is possible that we may interest some merchant going along the street in some way in which to use electric power or gas. That is all. We don't keep any card system, and you can ruin your solicitor by making him do too many things to get business. At our morning meetings we talk over business of the past day, telling them about where they might improve or noting something to let alone. Of course, we have competition with the other company, which has been very strong, and we have pushed gas for all lines of work. We do quite something in the line of keeping lists of vacant houses in the office for people who might move into town. Of course, we don't keep them where they are not equipped with gas. Parties moving into town are often told to go to the gas company and they can find a house very quickly. We get many good returns from that. Selling gas stoves is a thing we are pushing hardest just now, although we sell in Lincoln as many gas stoves in winter as in summer. Over 9,000 gas ranges are being used there. We used to take in second-hand stoves, a party might use a stove 4 or 5 years, then come back and trade it in for a new one. We didn't see that that increased our gas consumption. We are not taking in second-hand stoves this year, and are selling more than we did last year when we did take them in. Those second-hand stoves are not going back to the second-hand people, but are going into basements for laundry purposes. We sell laundry stoves, of course, and we educate the women in their use, and if we can't sell them laundry stoves in addition to the new ones, we put the old ones down in the basement for laundry purposes and connect them up free. These are used a great deal, for modern houses are now equipped with basement laundries. We push work on dead services very hard, sometimes offering the solicitor a bonus for getting them. Last week one of our agents closed up seven—a very fine business. One had been dead for 8 years. At the present rate we will have pretty nearly all of them back by the first of the year. We have a system of duplicate orders for fitters. I may not be able to explain this very clearly. When a fitter goes out with an order, the order clerk makes a duplicate, gives the fitter one, the other being kept in the office. The fitter goes out with his order, when the work is completed the customer signs it and the fitter again returns it to the office. We know what the fitter has to do when he goes out on that kind of work. We know the order has been completed, because the party has signed it, and the work is O. K. He also leaves a postal card, which comes in signed by the party for whom he did the work. As to the bonus for the different lines of work, we at one time gave the fitters a bonus, not to let them make a lot of money but to get them interested in the work. The average fitter with the averge company does so much work—what he is paid to do, and if you can get that man interested in the work sufficiently to turn in some tips from people he calls on, and whom he would not stop to talk to before, he will make some business for the company.

The President—We are a little way ahead of our programme, or certainly up to it. Two days before this meeting Mr. Klumpp wrote he would be here to deliver his talk on "Calorimetry." Yesterday I received a telegram from him in which he said that things had turned up over which he had no control and that he would not be able to come, but had sent his notes here by special delivery. His lantern slides are here and, if his notes reach here in time, Mr. Macbeth has kindly consented to read them and present his lecture.

On motion of Mr. Burt an adjournment was ordered.

THIRD DAY—MORNING SESSION.

The President opened the proceedings by introducing Mr. B. C. Adams, Lincoln, Neb., who read the following paper on

ADVANTAGES OF HIGH PRESSURE IN A LOW PRESSURE SYSTEM.

[For the text of the Adams paper, see JOURNAL, July 25, p. 148.]

Discussion.

Mr. Chubb—As I understand from Mr. Adams' paper, his gas is all distributed from the plant through one main, which necessitates putting increased high pressure from the centrifugal blower on it. I have had experience with high pressure in a large plant, and although we had three or four outlying holders, distributing gas from them besides from the main plant, and in addition thereto our pressure main ran at least 2 miles from the plant before it distributed into the other main system, we had trouble with our fan blowers. A blower is liable to fail or stop through some ontoward happening and make it necessary to stop right at the time of the maximum load, which would drop the pressure all over the city very materially. Does Mr. Adams run his blowers with steam or by motor, whether he runs 2 or 1, if only 1 what provision he has for starting the other one in case the first should fail. I should think, with the difference of pressure at which Mr. Adams says he is distributing gas, viz., from 1½ inches to 14 inches, he would experience trouble with appliances of all kinds—stoves, arc lamps, small lamps—in fact, all appliances. If a consumer lives in the territory receiving 14-inch pressure and an appliance is installed there, it is adjusted at that pressure. That consumer may live there 6 months, then move into a high pressure territory. I think that the gas orifices in the appliances right straight through would have to be changed. I don't believe there is any appliance that would work satisfactorily and efficiently at each variation of pressure. I agree with him that more than necessary is better than not enough, but I don't believe we can depend on the average consumer adjusting his gas valve to take care of the pressure. I think the gas company will have to do that. The installation of old 3-light meters which have been discarded as being too small with ordinary pressure, and are now being utilized under greater pressure, I think is a good scheme to get rid of them. I am not aware whether there is any objection to this method, but I think it a very good idea. I know I have a great many of them on the shelves that I can't use. The whole subject of gas distribution is very important, and what we

should do is to give the consumer just as little to kick over and think about as possible. There is coming a time of reckoning some day, if the consumers here and there all over the city are complaining on account of a too low or too high a pressure, too much air in the gas, or not enough gas and the gas bills running up. I think we want to give the consumer a pressure over which he cannot kick; or, if he does kick we can explain to him he is getting absolutely uniform pressure; by which I mean a variation of not over 1 or 1½ inches during the 24 hours.

The President—Did Mr. Chubb find that gas appliances will require readjustment for varying pressures above 2 inches? In other words, if you adjusted a gas stove for 2 inches and got 4 inches, would you get the proper mixture of air? In other words, won't the gas draw in its proper proportion of air? Of course, I realize that when you get down to very low pressure, as Mr. Adams brought out in his paper, a serious condition is reached; but after you get enough pressure does it make any difference? Have you any experience causing you to believe you had to readjust your appliances for excessive pressure?

Mr. Chubb—I have not had any experience with pressure to exceed 3.5 inches, and have never found it necessary to change the adjustment of an orifice of a stove for a pressure, say, from 2 inches to 3½ inches; but I think when you get up to 14 inches it would make a difference.

The President—Has anyone had any experience in troubles from excessive pressure for the reason offered by Mr. Chubb? I think we have been a little "old fogey" in some of our ideas of having traditional things, like 5 inches as a maximum pressure, or 20 grains of sulphur in gas, or making expansion joints in mains, and that the object of this Association is to do away with these traditions. We want to find out if fact is back of these things. Has anybody had any experience, as brought out theoretically by Mr. Chubb, that excessive pressure causes a gas stove to go out of adjustment.

Mr. Green—A year ago I was called upon to make some remarks about high pressure, and did so, favoring high pressure. I remember distinctly, figuratively speaking, that I was warmed up for it. After the meeting was over one of the older men of the Association called me off and gave me a very positive talk in very forcible and emphatic English that probably would not be sanctioned by the best works in diction. He told me in unmistakable language that I didn't know what I was talking about, and I was not prepared to say he was not right. When I received a copy of Mr. Adams' paper I was very much gratified to find that some of the larger plants were looking favorably upon high pressure, and I was very much interested in the paper; but as I knew nothing about the topography of Lincoln, I considered it rather impossible to give a very elaborate opinion on something that I knew nothing about. We have very few complaints. I was looking over the books a couple of weeks ago, and found that, for the last 6 or 8 months, the record showed on an average about 4 complaints a week, which, on the basis of 400 customers, would be one complaint per 100 customers per week; 75 per cent. of those complaints were easily remedied by a mere regulation of stoves; the balance of the complaints were from leaks, with other miscellaneous causes. Referring to regulating stoves under high pressure, all our stoves are set for ⅛. Perhaps I might better explain that we install governors in every case except where the people object to them. The consumer pays for the governor, to which they sometimes object, but in nearly all cases we have governors installed which regulate the pressure to about ⅛, and have no trouble in regulating the stoves after we put in the governor. It is simply a matter of regulation of the air and the orifice. A sample of the complaints that we have occurred day before yesterday. I went into a cellar and discovered that our men left a shipping pin in the governor. I took it out, laid it on top of the meter, took the pressure under the governor, and discovered that it was working all right with about 36 to 38-tenths pressure. Then I put a lead pencil in the top of the governor to release the action of the governor, and found that the pressure was as indicated there on the plat. I thought that pressure under the governor was sufficient for anybody, and so left the pin out. About 6 o'clock that evening I was called up, and the lady said: "What on earth have you done to my gas? I have had a pan of water on the stove for an hour and it is not hot yet." I called her husband to the 'phone and explained to him how to replace that shipping pin in the governor. I guess it is all right now, as I haven't heard anything further. The pressure with that shipping pin in was between 7 to 8 inches, I believe. She probably didn't use the stove in the afternoon, and I interpreted her meaning to be that she had probably 3 or 4 quarts of water on the stove, and it took her a few minutes longer to heat that water than it usually did. She noticed the difference in the pressure, but didn't know the cause. I find also, in cases where we put on governors, they remark there is no heat in the gas; but we find after they get used to it that the result is much better with about 3.6 pressure than with a higher one, although those who have the high pressure, and use it right along, are satisfied with it. I have also noticed, in the matter of bills, where persons have been using the high pressure, and then installed the governor, it seemed to cut down their bills a very little. I have taken particular pains to watch that in a great many cases, and have found only a few where the difference in the bill was noticable. Where they use stoves I haven't found any difference. It seemed to me they get more heat under the high pressure, and probably in less time, than they do under the governor, but the expense of the gas would be practically the same. In the case of store lighting, however, it is different. The ordinary Welsbach burner, No. 71,302, under our normal main pressure, will consume somewhere around 7 or 8 feet of gas, but it gives an elegant light. Several people have complained about the bills, and have put in governors, but invariably they told us to take their governors out; they would rather pay for the extra light in the store than to have the governor in and get the poorer light. The inverted arc, however, has taken the place of a great many of the 71,302 lamps, and in all cases where they use the inverted light we put in the governor; they will not work on the high pressure, and from the standpoint of the cost of gas it is less. They get a great deal more light with the reflex burners, and in a great many cases their bills do not vary, but they get so much more light for the same amount of money that they are very well satisfied. I think Messrs. Adams and Chubb spoke alone the line that they considered too much pressure better than not enough. We have discovered that we can regulate most of the pressures through anything except these inverted lights, but when we have too little pressure we cannot. Of course, with us it is absolutely necessary to have the high pressure. About 2 years ago the governor at the plant went back on us and stuck—it wasn't during the peak load, either; but we had about 20 calls in less than that many minutes. There wasn't a particle of gas in the outlying districts. We took the pressure at the office, and it showed a little less than 2 inches, which demonstrated to us plainly it was absolutely impossible to get along without the high pressure. Other little matters I have noticed. For instance, drip from the mains. I think we got about 2 quarts in 2 years. We have absolutely no trouble in the way of gas congealing from frost, and we have a great many pipes running through areaways, some going up the extreme of the building. Last year we had to take up one main on account of a sewer being put in. We ran it over the top of the ground and covered it with a little dirt and manure, but it was partly exposed. It was a 1¼-inch pipe and we expected all kinds of trouble, but there were no complaints. The service was satisfactory, although we had 3 or 4 consumers at the end of the main. I have been pleased to have several of the traveling salesmen mention to me that they didn't think there was a better light in the State of Iowa than that we produced. I don't say that egotistically, but give it to you as the only means I have of comparison with others, and while generally they tell me that, before they got the order, and I take it with a grain of salt, yet at the same time there wouldn't be so many of them using the same tactics if there were not something in it. Still better, we have had people come to Cherokee from Omaha, Sioux City, Des Moines, Grand Rapids, Mich., Rockford, Ills., and even Chicago—I remember those cases distinctly, who invariably spoke about the good condition of the gas—that is, its heat. They say it is much hotter than the gas they have been used to. They are very well satisfied with it, and invariably our price was higher than they had been paying. We charge $1.50, and I never yet had one person complain about his gas bill. Some say they run a trifle higher; others say they are about equal to those they paid in other places. I leave you to draw your own conclusions from their remarks. Mr. Chubb spoke about pressure. There are two ways of obtaining this pressure, either by compressing the gas into compression tanks, as we do, or by using the booster, as Messrs. Adams and Chubb do. I have nothing to say in favor of one or the other, but were I to say anything it might be that, with the compression system, you keep the pressure on the mains at all times the same. The pressure on the mains at our plant is always 12 inches, and it seems to me even pressure is worth something, rather than to have the varying pressure that you must have when you start up your blower and cut it off again.

Mr. Clausen—Going around the country I find the Blair booster system, of increasing the pressure during the hours of greatest consumption, is becoming quite common, especially in the cities of Illinois. I might mention Peoria, Springfield, Danville, Champaign, Decatur, etc. They are using the system of increasing the pressure at the high points of consumption; that is, during the noontime and the supper hour. They have outgrown the first installation of their mains, the consequence being that, during the hours of greatest consumption, the gas pressure is very low. Of course, gas plants are usually located at an extreme end of the city, and the idea is to increase the pressure up to a certain point for proper distribution, and if they only have one or two lines running up town, they use governors to regulate the pressure to the desired amount. As to the admixture of air and gas, to which our President just called attention, I would say, if the appliance is properly adjusted to the maximum pressure, and to the consumption of the burner as well, there will be no increased trouble from this source; that is, it is not necessary to readjust the air mixture. But if you are cutting down your pressure at the plant, instead of at the regulating device, you are going to have a little trouble with carbonization if you don't readjust your air mixture. The high pressure system in low pressure mains is, of course, old in the natural gas business. They are using high pressure and station governors in the low pressure systems, carrying from 4 to 5 ounces, and find no trouble with their ordinary meters. We are introducing them into almost all the natural gas towns that have been converted from the artificial into the natural. The fact that you are getting a higher incandescence is due to the fact that you are getting closer, constant flame by admitting the air, so as to give the higher flame temperature. The B.T.U. in the gas are not any greater than in anybody else's gas, if you keep it up to the point of 600 to 650; but the reason that you are getting a higher incandescence is on account of the higher flame temperature which is possible by using a higher pressure. We find the use of the booster system, to which the paper refers in high pressure distribution, such as used in the northern Illinois towns, going 35 to 50 miles under high pressure, is becoming

quite common, and from what I can learn it is very popular. It is doing the work without any increased cost for new mains.

The President—I don't like to cut off this discussion, but we have encroached on the time of the other paper, and I will ask Mr. Adams to close.

Mr. Adams—I am very glad this paper has produced such a good discussion. There was, in fact, a lot more in the discussion than I had in the paper. Some of the things were left out purposely; the others I forgot. As to the blower equipment with duplicate, we have a steam-driven belted blower, and the duplicate is a motor-driven blower. We try to keep our holder pressure around 8 inches. Although we would have some trouble should we shut down, it would be but momentary, and I believe no one would be without gas. I believe there will be some difficulty, but we are optimists, and there may be some way to get around it that I don't know about. I think the question as to variation in pressure and adjustment has been answered, but I believe it is true that, under the higher pressures, you get a better mixture of air and gas and a more complete combustion than you can get when your pressure goes below a certain point. These adjustments have bothered us very little, and I believe the higher you get your pressure the less trouble you have on that adjustment business. I think if we could carry 20 inches we would have less complaint than under 8 inches. I want to say that you gentlemen, who are trying to produce uniform quality of gas by making candle power tests, are not making uniformity of gas in regard to heat units, and that is what you really want to get. Our public service commission trouble has come largely from a varying heating value rather than a varying candle power. Mr. Green recommends a compression system. I would say, in answer thereto, I do not believe you should maintain the high pressures that we maintain for 24 hours during the day. There is no necessity for it, and, of course, in our case the cost would be absolutely unnecessary. We want to keep the cost down as much as possible, and only pump when we have to.

The President—Mr. J. B. Klumpp, of Philadelphia, is unable to be here. Mr. Macbeth has kindly agreed to present the paper, which bears the title

GAS CALORIMETRY.

[For the text of the Klumpp paper, see JOURNAL, July 18, p. 101.]

Discussion.

President-elect Burt in Chair—In connection with this subject, I would like to read the definition of heating value of a gas as adopted by the American Gas Institute. This definition was gotten up after a great deal of study of the subject, and I think we ought to have it embodied in our proceedings. It is this: "The heating value of a gas is the total heating effect produced by the complete combustion of a unit of volume of the gas, measured at a temperature of 60° F. and a pressure of 30 inches of mercury, with air of the same temperature and pressure; the products of combustion also being brought to this temperature."

Mr. Chubb—I would like to ask what is the cost of one of these cabinet calorimeters. I want to get this on record, so that the other members will know. Several have asked me, and I didn't know what it was. I think if this information is obtained it might be well to put it in the record.

Mr. Kellogg—We have just ordered a calorimeter, and the estimated cost of calorimeter and installation is $600. I have no doubt that is very nearly correct, because it is being installed by the United Gas Improvement Company. This Company has made a great many installations of it and know how to do it.

Mr. McLean—Does that include a cabinet?

Mr. Kellogg—Yes.

Mr. McLean—We have a Junkers calorimeter and made our own arrangements for installation, but all of our cabinet work, including the chemist's counter, is made by a local concern. Our counters are all covered with soapstone, purchased direct from the manufacturers, the cutters of the soapstone. We finished and polished the tops ourselves. The counter without the soapstone costs about $4 a running foot. That is, of course, equipped with drawers and well finished in every particular.

Mr. Addy—I fear these statements of cost might lead some of the members to think it impossible to obtain a calorimeter at a price within reach of some of the plants; and I would like to state, therefore, that the cost of a Junkers calorimeter alone is $150. The meter and the governor are extra. My impression is that the meter can be obtained for $25, and it seems to me that, where the work is done by the men at the plant, it could be done satisfactorily at a very much lower cost than the figures which have been stated.

Mr. Fair—I would like to ask if the calorimeter is operated by the men at the works.

Mr. Addy—We employ men especially for laboratory work, but I can see no reason why any intelligent man couldn't operate a calorimeter.

Mr. McLean—I think we are all very much obliged to Mr. Macbeth for the lecture he has given us. I believe it has been interesting and instructive to everyone, and I move our thanks be offered to him for his kind service in delivering it. [Carried.]

Mr. McLean—I move further that the thanks of the Association be sent to Mr. Klumpp for preparing the lecture. [Carried.]

The President—We will pass to the order of general business. There are a few telegrams and letters of regret, from J. B. Klumpp, F. A. Kidder, Edward G. Pratt, D. R. Russell and A. B. Eaton. I believe Mr. Kellogg has a matter that he wishes to bring up.

MR. KELLOGG AND THE NATIONAL COMMERCIAL GAS ASSOCIATION.

Mr. Kellogg—I would like to say a few words in reference to the National Commercial Gas Association. This Association has been organized, as you no doubt all know, to develop the commercial end of the gas business. In all of our larger Associations the engineering end has received most of the attention. These two Associations are not competitors in any sense, and the latter is growing very rapidly and becoming quite a factor in the business. It sends out periodical bulletins, and I am sure that there is hardly a company represented here but could afford to take out a membership in it. These little bulletins are easily worth the $5 cost of becoming a member, the initiation fee having been suspended for the present.

Mr. Macbeth—I would like to add a few words to the remarks by Mr. Kellogg on this matter of the National Commercial Gas Association. There isn't any question but that the commercial end of the gas business has been very much neglected, and there are good reasons possibly why this has been the case. In former years, when the gas man had customers coming to his office right along asking for service, you could hardly blame him for sitting down rather than going out after the business, especially as his sales were more strictly confined to gas rather than to our latest conception of service. But the lines of competition have been drawn much closer, and the electric man is going out and advertising that he will furnish illumination with electricity at the same cost as the consumer formerly paid for gas; as a consequence it is necessary for you to go out after the business. Salesmen are made. They are born, of course; but when it comes down to the real man, the bona fide salesman, who delivers the goods, he has to be educated to the business. Now the more we can do to educate these men the greater increases are we going to have in our business. Mr. Kellogg stated that the initiation fee has been waived temporarily. It is at the option of the President, however, to recall this waiver—next week, if he so decides. But even at $10 it would be a first-class investment for every man you have who comes in contact with the public. I wouldn't advise any man to spend $5 for dues, if I did not know that he would get returns to the value of at least $25, from the information and points which he may secure from the monthly bulletin of the National Commercial Gas Association. This bulletin is published by gas men, for the gas men on the sales-end of the business. We have endeavored (I say "we," because I am a member of the Publication Committee) in every way to get articles of authority by men who are in touch with the field, by men who know of what they speak and have had experience. In other words, from men who are practical, non-technical, and who write in a way-that-anyone-can-understand-and-go-and-do-likewise style. We try to keep matters of a strictly advertising nature out of the bulletin, and to have articles on subjects of wide interest appear regularly and in such detail that the subject matter may be applied in your own town. How many ideas do you have to get, applying perhaps to but one condition on one installation, to pay for your membership for several years in the National Commercial Gas Association? Furthermore, as this gas sales proposition is comparatively new—that is, the cleaner kind of sales, the scientific sales, the kind that stay sold—there is an opportunity for your men now to read this bulletin and actually, without conscious effort, absorb much of the information contained in it. However, should you wait a couple of years to take up this membership question, you will undoubtedly have to take it up some time if you remain in the business. Then when the great, big ball has started rolling, and has attained considerable speed, you will find it almost impossible to come in at that time and as readily get the benefit to which you are entitled, without an amount of study quite out of all proportion to the profit that you may secure at this time from an occasional half hour spent in reading the bulletin. A number of company sections are being organized in various parts of the country; also some State sections. I am going to Denver next week, where they are organizing a State section. To give you an idea of the phenomenal growth of this Colorado section, I might state that, January of this year, they had less than 10 members; to-day they have 100, and expect more by the end of next week. The information available for you from the meetings of these State and company sections, as reported in the monthly bulletin, will be of such a nature that every man can get a return for his time, greater than that afforded him by the same amount of time spent in any other way. The articles in the bulletin are unlike articles under similar titles in the technical journals, which are frequently far from elementary, but are of a nature to be directly applied to your daily problems or to those of your salesmen.

APPOINTMENT OF COMMITTEES.

The President announced the appointment of the following committees:

Manufacture—Mr. William J. Bertke, Chairman, and Messrs. A. W. Zahn and B. C. Adams.

Distribution—Mr. A. W. Borden, Chairman, and Messrs. O. B. Mathews and G. M. Johnson.

New Business—Mr. Geo. S. Carson, Chairman, and Messrs. E. B. Craidy and R. W. Parker.

Uniform Accounting—Mr. G. I. Vincent, Chairman, and Messrs. F. Maple and G. S. Forest.

Construction—Mr. C. N. Chubb, Chairman, and Messrs. T. B. Hopper and William Bradford.

Membership—Mr. C. B. Fair, Chairman, and Messrs. H. B. Maynard and C. N. Chubb.

Public Relations—Mr. L. L. Kellogg, Chairman, and Messrs. Geo. McLean and J. Haines.

Votes of Thanks.

On motion of Mr. Addy the following resolutions were adopted:

Whereas, The success of this convention has been largely due to the work and the thoughtfulness of a few individuals.

Resolved, That a vote of thanks be hereby tendered to His Honor, the Mayor of Sioux City, for his expressions of kind feeling towards us and the companies we represent; to the newspaper representatives for the good reports of our proceedings, so free from criticism and so often complimentary; to the officers of the Association for the large amount of time so generously given to our interests; and, particulary, to Mr. Waring for the able manner in which he has presided over this convention; to Miss Nash for her faithfulness in the tiresome work assigned to her; to Mr. Hopper, our Secretary *pro tem.*, who has so willingly and without compensation undertaken to complete the work of our absent Secretary; to Mr. L. L. Kellogg, Manager of the Sioux City Gas and Electric Company, and his assistants, for their constant effort to add to the pleasure of our visit and give us the royally good time which we anticipated and which we have had; and, finally, we would extend special thanks to Mr. R. C. Dawes for his very able, interesting, and, at this time, particularly appropriate address, and to all those who have contributed papers or have given us the benefit of their experience.

The President—I would like to say one word before adjourning. I appreciate very highly the honor you have bestowed upon me in making me your President. We have already begun making plans for next year's meeting. If there is nothing further, the Association will stand adjourned.

Liability of Gas Companies for Injuries Resulting from Escape of Gas.

[Prepared for the Journal by Mr. John Edson Brady, Attorney-at-Law.]

Gas companies, in the matter of liability for negligence, stand upon much the same footing as other corporations. There are no doctrines of the law of negligence peculiar to companies engaged in the manufacture of gas. The obligation resting upon a gas company requires the exercise of ordinary care and prudence in the construction of its works and in the conduct of its entire business, so as not to endanger life and property; and the same may be said of any corporation or individual.

Gas companies are not insurers against injury by the escape or explosion of gas. They are not liable merely by virtue of the fact that gas has escaped from their pipes to the injury of some person or of his property. The liability, if any, must be predicated upon the negligence of the company or its agents. Companies of this kind are held to a degree of care that is commensurate with the dangerous character of the commodity in which they deal. If a gas company fails to exercise this degree of care, and injury results from its negligence, it is, generally speaking, and in the absence of contributory negligence on the part of the injured person, legally responsible.

In Hutchinson *v.* Boston Gas Light Company, 122 Mass., 219, it is said: "There is no rule of law which requires individuals or corporations to provide against an overwhelming calamity which, in the exercise of ordinary prudence, could not have been foreseen. There must have been an omission to do something which a reasonable man, acting upon considerations which ordinarily regulate the conduct of human affairs, would do, or the doing something which such a man would not do. Probability of danger is to be taken into account, but not that which arises when the elements, with unprecedented power, overcome all ordinary restraints."

Among other duties imposed by law a gas company is under an obligation, not only to carefully and properly lay its pipes, and to see that they are sound, but to maintain an efficient system of inspection. The company is not required to keep up a constant inspection all along its lines, without reference to the existance or non-existence of probable cause of leakage, for an unreasonable degree of care is demanded from no one by the law, but it must use due and reasonable care in the inspection of its pipes and must keep them in a proper state of repair.

Nearly all of the claims for negligence brought against gas companies are based on accidents which resulted from the escape of gas from the company's pipes. Sometimes the gas escapes from the mains and finds an outlet in the pavement to the injury of some lawful user of the highway. Other times the gas escapes in a dwelling or other building, through a broken or defective pipe, or as a result of the negligence of someone in failing to see that pipes not intended for immediate use are properly capped. Many accidents have followed the turning off of the gas without notifying the occupants of the building affected, and then turning it on again, thus permitting gas to escape through the jets which were burning before the gas was turned off. Once the gas has escaped it may cause injury to the occupants of a building through inhalation, or it may in some manner be caused to explode and thus cause damage. Strange as it may seem, a large number of accidents, the damage bills for which are eventually footed by gas companies, are the immediate result of searching for leaks, which are known to exist, with a match, lighted candle, or some other equally efficient agent of disaster. It would seem that, in this late day, employees of gas companies would be better educated in their work and better acquainted with the characteristics of illuminating gas than to enter a gas filled cellar or room with a burning light. And yet there are recent instances of men in the employ of gas companies, who it might reasonably be supposed were fully enlightened as to the explosive properties of gas, bringing serious mishap upon themselves and others, and heavy legal liability upon their employers, in just this way. In all of these groups of cases various questions arise, upon which legal liability depends. Was the company actually guilty of negligence? Did it select competent workmen? Did it employ a sufficient system of inspection? Did it have notice, and could it have averted the cause of injury by prompt action? Was the injured party guilty of contributory negligence? The answers to these, and many other questions determine the company's liability.

In covering this subject the decisions will be classified with reference to the various rules of law which govern them. The facts will be stated as briefly as is consistent with a clear interpretation of the decision. And the salient portions of the opinion of the court will be quoted, for it is believed that the language which the court has used to express the law of the question before it, written after days, and possibly weeks, of deliberation, cannot be improved upon.

Destruction of Vegetation by Escaped Gas.

General Rules of Liability.—There are a few instances of cases where gas companies have been sued for damages to flowers, plants, trees and other forms of vegetation, resulting from the escape of gas from the company's mains and its percolation through the soil. The cases are not many and they probably represent but a very small portion of the total of such occurrences. In other words, gas companies have, in all probability, many times escaped liability for the destruction of vegetation through the failure of the injured party to bring suit, or a willingness on the part of the company to settle without suit. With one exception, in all of the cases, involving injuries of this character, the company has been held liable, and in that one it appeared that there was no evidence tending to show that the company had been guilty of negligence, a matter which the plaintiff must establish to be entitled to recover.

In January, 1904, the plaintiff in Wright *v.* The Wichita Gas, Electric Light and Power Company, 9 Kans. App.; 730, 59 Pac. Rep., 1,085, notified the gas company that he detected the odor of gas about his premises, and stated that he believed there was a leak in the company's pipes in that vicinity. An employee of the company made an examination of the plaintiff's premises, but was unable to locate any leak in the pipes. The following February plaintiff again notified the company that there was evidence of a leak at or near his house. Another search was instituted, but no leak was found. In April, after the company had for a third time been notified by the pluintiff that he detected the odor of gas in the vicinity of his premises, the company uncovered a portion of the main in the street adjoining the plaintiff's property. A leak was then discovered and at once repaired. The evidence also showed that at about the same time when the leak was discovered, several shade trees in the parking in front of the plaintiff's house, a vine on the front porch, some rose bushes and the bluegrass in the front yard, withered and died. All the vegetation that died was growing within a radius of 50 feet from the point near the center of the street where the leak was discovered.

It was held that the following instruction was properly given to the jury: "You are instructed that the defendant, being authorized by the authorities of the city to lay down its pipes and convey gas in and through them under the surface of the streets to various parts of the city, it was its duty to conduct its whole business in all its branches, and in every particular, with ordinary prudence and care. Care and diligence were required from the defendant to lay and maintain its pipes in such a manner as that damage should not result therefrom, and the degree of diligence to be used should be determined from the danger, if any there was, in the use of such an element as gas."

An objection was made in behalf of the Company that the above should have been qualified by the following instruction: "So far as this case is concerned, the degree of care and diligence to be exercised

is to be determined by the probability and liability, if any, of escaping gas injuring growing trees and shrubbery. In other words, could the Company reasonably have apprehended that escaping gas from such a leak as you may find existed, if any, would cause the destruction of the trees, shrubs and grass of the plantiff?" The language quoted was embodied in an instruction asked by the defendant and refused by the court. It was contended that, while the instruction as given by the court would apply in cases of injuries to persons or property caused by explosions of gas, or to cases of injury inflicted by asphyxiation, it would not be applicable to such cases as the one at bar, and that unless the Company could reasonably have apprehended that escaping gas would cause the death of vegetation, it would not be liable. "It has been held," said the court, "That where the death of a shade tree was coincident with the leakage of a large amount of gas from a main, and that after the main was recalked there was a renewed growth of vegetation, such facts could be regarded by the jury, in view of all the evidence, as leading to the conclusion that the effect of the gas escaping in the earth and in the air was to cause the death of such shade trees."

A gas company, though in lawful occupation of the street, must so conduct its operations as not to injure neighboring property. Under this theory it was held, in Evans *v.* Keystone Gas Company, 148 N. Y., 112 (1895), that the defendant Company was liable for the destruction of shade trees upon the plaintiff's premises, caused by the escape of gas from the Company's mains. The plaintiff testified that, after he commenced to reside upon the premises in question, the defendant placed its line in the highway in front of his property, and that, thereafter, there was a perceptible and constant escape of gas in large quantities, until the pipes were taken up and caulked. He described the decay and death of his grass and trees in successive years, during the time, and how, after the caulking of the gas line, he reset trees which lived and grew. He also testified to the effect of the gas upon the surrounding earth in depriving it of moisture. Other witnesses corroborated him with respect to the leakage of gas, the death of the trees and vegetation during the time, and the dry condition of the soil near the places where the leakages were noticed. It was held that this testimony was sufficient to warrant the jury in finding that the Company was liable for the death of the trees. The measure of damages in a case such as this is the difference in the value of the property as it was before the trees were destroyed and its value after their destruction.

Gas belonging to the Auburn (N. Y.) Gas Light Company escaped from its mains into sewer pipes located near them, and thence into greenhouses belonging to one Armbuster. Armbuster sued the company for the damage caused to his plants by the gas. An expert testified that one of the constituents of gas manufactured by the defendant company was carbon monoxide, which he said, has two distinct effects on plant life, both of them bad. For one thing it hurts the growth of the plant. The other effect, which is still worse, is to destroy the assimilating powers of the plant. The company was held liable for damages. "Clearly it was the duty of the defendant," said the court, "To exercise due care and diligence to keep its gas constantly under control and prevent it from escaping into our dwelling houses or places of business." This is the case of Armbuster *v.* Auburn Gas Light Company; 18 N. Y., App. Div., 447 (1897).

(To be Continued.)

Bureau of Information, The American Gas Institute.

Under the direction of the Institute it has been decreed: 1. That the privilege of submitting questions be limited to members of the Institute. 2. Neither the Board of Directors of this Institute, nor the Institute as a body, make themselves in any way responsible for the statements of fact or expressions of view given out by the Bureau of Information.

BUREAU OF INFORMATION, THE AMERICAN GAS INSTITUTE,
HEADQUARTERS, GAS OFFICE BUILDING,
V. F. DEWEY, Chairman. DETROIT, MICH., Aug. 19, 1910.

Question No. 68.—What information is there concerning the operation of coal gas retort benches in connection with a non-coking coal of high volatile? Has such a thing ever been attempted, and, if so, what disposition was made of the solid residual remaining in the retorts after volatilization? Has it ever been made to burn this residual in the furnaces under the benches? If so, just how was it manipulated, and was it necessary to add a certain portion of green coal?

Question No. 69.—What is the best practice in velocity of gas permissible through, first, water gas set; second, oil gas set; third, coal gas works (in the above is meant velocity of gas through the connections and piping connecting the various units); fourth, water gas scrubbers of the spray or brick variety; fifth, purifying boxes; sixth, through gas works or connections; seventh, through multitubular condensers?

Question No. 70.—In considering an equation relative to the operation of water gas machines, if A equals the total cubic feet of air under the grate bars for any given number of blasts and S equals the pounds of steam passing through the fuel bed for an equivalent number of runs, what should be the value of the constant X in the equation $X = \frac{A}{S}$, in each of the following conditions: Size of machine, 6 feet; size of machine, 8 feet; size of machine, 10 feet; size of machine, 12 feet; kind of fuel, hard coal; kind of fuel, oven coke; kind of fuel, gas coke?

Items of Interest
FROM VARIOUS LOCALITIES.

"P. P., writing under date of 31st ult., says: "Mr. C. C. Sloan, who was formerly Superintendent of the Calumet Gas Company, which supplies gas to the Michigan districts of Calumet and Laurium, has been appointed Superintendent of the Crookston Company, work on the new plant for which is well under way. Crookston is a growing place of about 9,000 population, in the Northwestern section of Minnesota, and it is certain to become a vastly larger settlement owing to its importance as a railroad center."

THE Milwaukee Gas Light Company has hooked up the west side of the outlying settlement of Center City. It took about 1¼ miles of pipe to accomplish the purpose; but that the game was worth the candle would seem to be shown in the fact that the Burnham brick yard is on the lists as a regular consumer.

FINANCIAL estimators of the advance type have figured it out that the earnings for the calendar year 1910 on the stock of the Chicago Peoples Gas Light Company will be not less than 8.8 per cent. This, too, means after allowance is made for interest bearing funded debt.

THAT the U. S. Lighthouse Board will, and speedily, turn practical attention to the insistent demands for the lighting, by means of gas buoys, of Broad Sound, Boston Harbor, is certain. The last petition for such action, which was forwarded to Washington something over a week ago, had 52 signers. Of these 18 names represented as many ocean going lines, 9 were from leading banks and trust Companies, and 25 were from the most important business houses in the city.

"W. V. M.," writing from St. Louis, Mo., under date of the 28th ult., incloses this: "Mr. Theodore O. Kennedy, who graduated from the School of Engineering, University of Missouri, with the Class of 1907, has been appointed Superintendent of the Lincoln (Neb.) Gas and Electric Company. Having graduated, Mr. Kennedy entered the employment of the Denver (Col.) Gas and Electric Company as an electrical engineer. Early this year he was in charge of the plants of the Montgomery (Ala.) Light and Water Company, under Mr. G. A. Montgomery, during the latter's illness. The three plants named, as you know, are controlled by the H. L. Doherty syndicate."

THE New York *Herald*, of the 28th ult., is our authority for the statement that work on the boring of a tunnel through the rock 250 feet below the bed of the East river, from the Lawrence Point plant of the Consolidated Gas Company, Astoria, L. I., to the storage holders in the Bronx district, will be commenced within the next 3 weeks. The tunnel is the first step to be taken by the Company in carrying out its completely matured plan of enlarging the Lawrence Point (or Casino Beach) plant, so that ultimately therefrom all the gas used in New York city, the Bronx and possibly Brooklyn boroughs will be distributed. Two mains, each 6 feet in diameter, will carry hundreds of millions cubic feet per diem to the respective distributing storage vessels. The tunnel construction will be of sufficient bore to permit the placing of additional mains up to doubling the initial transferring capacity. The maximum estimated cost of this boring and its equipment is $3,000,000. The 10 by 7 tunnel, between Ravenswood, L. I., and New York city, which has been conveying gas from Long Island City to Manhattan Island for years, has proven itself as an investment second only to the early real investments made on Long Island less than 20 years ago.

MR. A. J PICKENS, since 1908 Assistant Manager and Engineer to the South Bend and Mishawaka Gas Company (in reality this Company is a factor in the groups controlled by the Northern Indiana Gas and Electric Company), has been appointed to a responsible position with the Susquehanna Railway, Light and Power Company, in its New York headquarters. Just prior to his departure, Mr. Pickens was presented by the employees of the South Bend office with an umbrella that would likely be an ornament in anybody's rack.

THE Ford-Fischette Construction Company, of Clyde, N. Y., has been awarded the contract for putting down the gas main that is to connect the gas supply of the villages of Clyde and Lyons.

ADVICES from Boston, Mass., dated the 5th inst., are to the effect: "By a decree entered last week in the U. S. Circuit Court, the Massachusetts Board of Gas and Electric Light Commissioners is restrained from entering any suit against the Haverhill Gas Light Company in respect of the price of gas in that city. The decree terminates a suit brought against the Board which has been pending in the U. S. Court since 1900, in which year the Board fixed the price of gas for Haverhill at 80 cents per 1,000 cubic feet. For various reasons the Company claimed it was impossible to manufacture gas of the quality desired at the price fixed by the Board. Under the current decree it was agreed that, after July 1, 1911, gas should be supplied at the rate of 90 cents per 1,000 for 1 year, when a reduction to 85 cents becomes effective. It is also stipulated that when the Company's annual output shall reach 430,000,000 cubic feet the 80-cent rate shall go into effect.

MESSRS. WM. AND THOS. WINN, Wm. Brown, Jas. Freeman and Jos. Douley, prominent in the affairs of the settlement of Duryea, Pa., have given notice, through Solicitor-Attorney L. J. Schwartzkopf, that they will apply Monday week to the Governor of Pennsylvania for a charter authorizing the Duryea Gas Light Company to do business in and about the district of Duryea. It is specified that the gas manufactured shall be supplied for lighting purposes only.

THE Woodmont (Conn.) Association has entered into a contract with the New Haven Gas Light Company for the maintenance of a certain number of lamps on the streets of the named place, for a period of 4 years, from April 1, 1910, at the rate of $25 per lamp per annum. An all-night table is followed, and the price includes lighting and extinguishing, care and maintenance.

THE Lancaster (Pa.) Water and Light Company has purchased the properties of the Columbia (Pa.) Gas Company. Mr. E. Edgar Titzel has been elected President of the Columbia Company.

"T. R. M.," writing from Clinton, Ia., under date of the 2d inst., says: "The reorganization of the Mapleton (Ia.) Gas Company resulted in the following choice of officers: President, J. E. Duschl; Vice-President, M. J. Golberger; Treasurer and Secretary, C. C. Jacobsen. The plant is to be rebuilt."

EXCELLENT results are following the appointment of Miss M. S. Purdon by the Peoples Gas and Electric Company, of Oswego, N. Y., as demonstratress of how to use gas in the kitchen. Besides her work in the office, Miss Purdon makes personal calls on the residents who desire to be taught how to use gas ranges to the best advantage. A postal card or a call on the telephone immediately brings the teacher to the place from where the notice sounded.

THE well-known pipe making concern of James B. Clow & Sons, of Chicago, are now operating in their Coshocton (O.) plant a 1,500 horse power producer gas plant, which furnishes all of the water, light, power and compressed air required in the plant, in addition to the gas required in drying all of the cores and flasks used in the pipe foundry. Indeed, so well have the Clow Company proprietors become pleased with the system that they have retained Mr. Henry I. Lea, Consulting Gas Engineer, of Chicago, for the purpose of recommending alterations with extensions made necessary by the rapid growth of their business, which will speedily require 3,000-horse power in producer capacity.

THE Sapulpa Electric Company, which operates a central station business in Sapulpa, Okla., has been purchased by the H. M Byllesby Company, of Chicago, and that well-known house will hereafter operate and manage the property. According to the last Federal Census, Sapulpa has a population of 8,383, showing a gain of nearly 100 per cent. since the State Census was taken 3 years ago. The electric lighting and power system at Sapulpa is new, but in the past it has not been able to serve about 50 per cent. of the demands made upon it; but the Byllesby people set at work immediately on the installation of a 500-kilowatt generating unit, which will more than double the capacity at the station. Located in the heart of the oil and gas producing fields of Oklahoma, a rapid and healthy growth in the population of Sapulpa is assured.

MR. RODERICK M. STARKWEATHER, for 17 years and over on the staff of the Northampton (Mass.) Gas Company, will this week open a thoroughly equipped store in the Phœnix Building, Holyoke, Mass., where he will keep on show, for sale or hire, a complete line of gas and electric appliances of all sorts.

THE Boston Consolidated Gas Company reports an increase in the August output, over that for the corresponding August a twelvemonth ago, of 6.7 per cent. We submit that these figures do not show premonitory symptoms of panic times.

THIS is from a local paper, dated the 31st ult.: "The well trained and prompt action of the emergency fire-fighting force of the United Gas Improvement Company's works at Point Breeze, Pa., prevented what might have developed into a bad conflagration, when a pile of waste took fire in the engine house, close to one of the large gasholders at 10 A.M. All the engines and other fire extinguishing apparatus speeded to the scene at 29th street and Passaquak avenue immediately the alarm was turned in; but such help was not needed. The waste is supposed to have taken fire from a red hot bolt that fell from the hands of a workman engaged in repairing a holder, that was ¾ up (90 feet or so) in the air. The waste was soaked with grease, which naturally kindled at once from the hot rivet, and in a twinkling the flames were blazing high. The alarm was sounded, the response was immediate, and the work was effective, in that in 6 minutes the riveters were once more at work."

ATTORNEYS MILLER AND MILLER, for the Tri-State Gas Company, have served the following notice upon the authorities of Stubenville, O., and upon constructor W. H. Bates: "You are hereby notified that on August 10, 1910, Jacob F. Wannemacker, *et. al*, Mary W. Hileman and Anna B. Borden, filed a petition in court against the Tri-State Gas Company for $3,500 damages, alleging they were owners of the property and suffered the above amount of damages because a double brick house owned by them was destroyed by an explosion of gas, which leaked or escaped from your mains on Lake Erie avenue. The purpose of this notice is to advise and warn you that the Company will hold you responsible for all expenses, damages, etc., adjudged against the Company in this suit, and you are further notified to come in and defend the suit or settle the same, that the escaping gas was due, wholly, to a break in the Company's main, caused by a sewer constructed by you near the house, in the plan and construction of which the main was fastened by you in an abandoned manhole, and the earth removed from under a long section of the main, and never replaced by you in a workmanlike manner so as to prevent sagging and breaking of the main, as was the duty of the city to do, and its constructor (H. M. Bates) as well. The break in the main and the consequent escape of gas and damage done were on account of the negligent excavation and construction of the sewer, and failure to tamp the earth, or otherwise secure the section of main pipe undermined by you so as to prevent the obvious breaking of the main pipe."

THE City Council of Nashville, Tenn., by a vote of 16 to 8, has decided to submit the new franchise under which it is proposed to permit the Nashville Gas Company to hereafter operate, to an election by the voters on November 8th. If we mistake not this is the date on which the general election for the year will take place in Tennessee.

RECENTLY the Board of Public Service, Sandusky, O., asked for bids for the public lighting of that city, in so far as that service is to be performed by means of electric arc lamps, for a term of years, beginning January 12, 1912. The only bidder was the Sandusky Gas and Electric Company, two proposals being presented. The first was $73 per arc per annum, if the Company were compelled to reset the poles (about 15,000) now in use; if not compelled to reset, $65 each. The present rate is $77.50 per lamp.

THE Blackman Manufacturing Company, to manufacture gas and electric lighting fixtures, has been incorporated in Bridgeport, Conn., by Messrs. F. Johnson, C. W. Thompson, C. O. Scudvall and others. It is capitalized in $20,000.

MR. F. D. MURPHY, of Elmira, N. Y., has been appointed Manager of the Susquehanna Railway, Light and Power Company, at Altoona, Pa., vice Mr. D. K. Dustin, who comes to New York, to the Company's main offices.

"Q. M. L.," writing from San Francisco, Cal., under date of the 29th ult., incloses the following: "The right of individuals and corporations to use the streets for laying pipes for heating purposes was affirmed in an opinion given the Board of Works by City Attorney Long. Long based the opinion, asked by the Commission upon the application of the Equitable Light and Power Company, upon the parallel case of the use of the streets for supplying gas for heating purposes. The State Constitution provides that the streets may be so used to supply illuminating gas or water for domestic and all other purposes. The Supreme Court has extended the use of gas for heating purposes and similarly the opinion held that the privilege to convey water included hot water and by implication steam."

THE City Council of Bozeman, Mont., has set September 20th as the date on which a special election is to be held to determine whether or not a franchise be granted for the operation there of a gas plant. Bozeman is growing rapidly, and the growth is of the right sort.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
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CHARLES H. WADELTON,
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MONDAY, SEPTEMBER 12, 1910.

The Market for Gas Securities.

A comparison of quotation of the leading gas securities show but fractional changes from last week.

The market has been quiet and all interests seem to be waiting for some decided optimistic news before advancing to higher prices that present values seem to warrant. Gas stocks and some industrials are certainly bargains at present prices.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.
115 BROADWAY, NEW YORK CITY.
SEPTEMBER 12.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	129	129¼
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	3,000,000	1,000	98	101
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas				
Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98½	100½
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	104	107
Con. 5's, due 1945, J. & J.	3,500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	131	135
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	¾	⅞
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	90	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	73	73½
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed				
Gold Bonds	7,680,000	1,000	104	106¼
Cincinnati Gas and Electric				
Co.	29,500,000	100	92	93
Columbus (O.) Gas Co., 1st				
Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. &				
Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	106½	—
Mortgages, 6's	3,600,000	—	89	100
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	3,500,000	—	102	105
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	99½	99⅝
Preferred	2,500,000	100	85	86½
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	106	106¾
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	80½	81¼
Preferred	25,000,000	100	91½	92½
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	106	106¼
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¼	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	100	102
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgages, 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112¾	115
General Mortgage, 5's	2,465,000	1,000	90	95
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	100	104
Washington (D. C.) Gas Co.	1,600,000	200	382½	385
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

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1839-2

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1839-2

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MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October, 1910. New York City. Officers: President, Wm. H. Bradley, N. Y., City Secretary, A. B. Beadle, 29 West 39th street, N. Y. City.

Canadian Gas Association.—Annual meeting, June, 1911. ————. Officers: President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, Nov., 1910. New York City. Officers: President, C. R. Huntley, Buffalo, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Guild of Gas Managers of New England.—Annual meeting, December. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, A. K. Quinn; Newport, R. I.; Secretary, Walter G. Africa, Manchester, N. H.

Illinois Gas Association.—Annual meeting, time, March, Chicago, Ills. Officers: President, A. S. Harrington, Chicago, Ill.; Secretary-Treasurer, C. B. Strohn, Elgin, Ill.

Illuminating Engineering Society.—Annual meeting, Baltimore, Md., Oct. 1911. Meetings of Sections, monthly. President, W. H. Gartley, Philadelphia, Pa.; Secretary, Preston S Millar, 29 W. 39th street, N. Y. City. Sections: New York: Secretary, Albert J. Marshall, 227 Fulton street. New England, Secretary, L. D. Gibbs 39 Boylston street, Boston, Mass. Philadelphia, Secretary, F. N. Morton, Broad and Arch streets Chicago, Secretary, T. R. Beebe, 157 Michigan avenue,

Indiana Gas Association.—Annual meeting, January 19, 1911, Fort Wayne, Ind. Officers: President, Carl H. Graf, Indianapolis; Vice-President, S. E. Mulholland; Secretary-Treasurer, Philmer Eves, Indianapolis Gas Company, Indianapolis, Ind.

Iowa District Gas Association.—Annual meeting, time, June, 1911, ————. Officers: President, Austin Burt, Waterloo, Ia.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ———— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association.—Annual meeting, time, Sept. 9 to 12, 1910; Aboard Boat, "Georgian Bay." Officers: President, B. O. Tippy, Grand Rapids, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April 13, 14 and 15, 1911; St. Louis, Mo. Officers: President, R. J. Irvine Secretary and Treasurer, W. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, December, 1911: Boston. Officers: President, E. N. Wrightington, Boston; Secretary, Louis Stotz, 36 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May 16, 17 and 18, 1911; Pittsburgh, Pa. Officers: President, John M. Garard, Columbus, O, Secretary, T. C. Jones, Delaware, O. Editor Wrinkle Department, F. W. Stone, Ashtabula, O.

New England Gas Association.—Annual meeting, third Wednesday in February; Boston. Officers: President, W. H. Snow, Holyoke, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

Oklahoma Public Utilities Association.—Annual meeting, May 9, 10 and 11, 1911. Officers: President, E. C. Reynolds; Secretary, Galen Crow, Guthrie, Okla.

Pacific Coast Gas Association.—Annual meeting, Sept. 20, 21 and 22, 1910, Los Angeles, Cal. Officers: President, W. B. Cline, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 925 Franklin street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April, 1911, Reading, Pa. Officers: President, J. H. Keppelman, Reading, Pa.; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

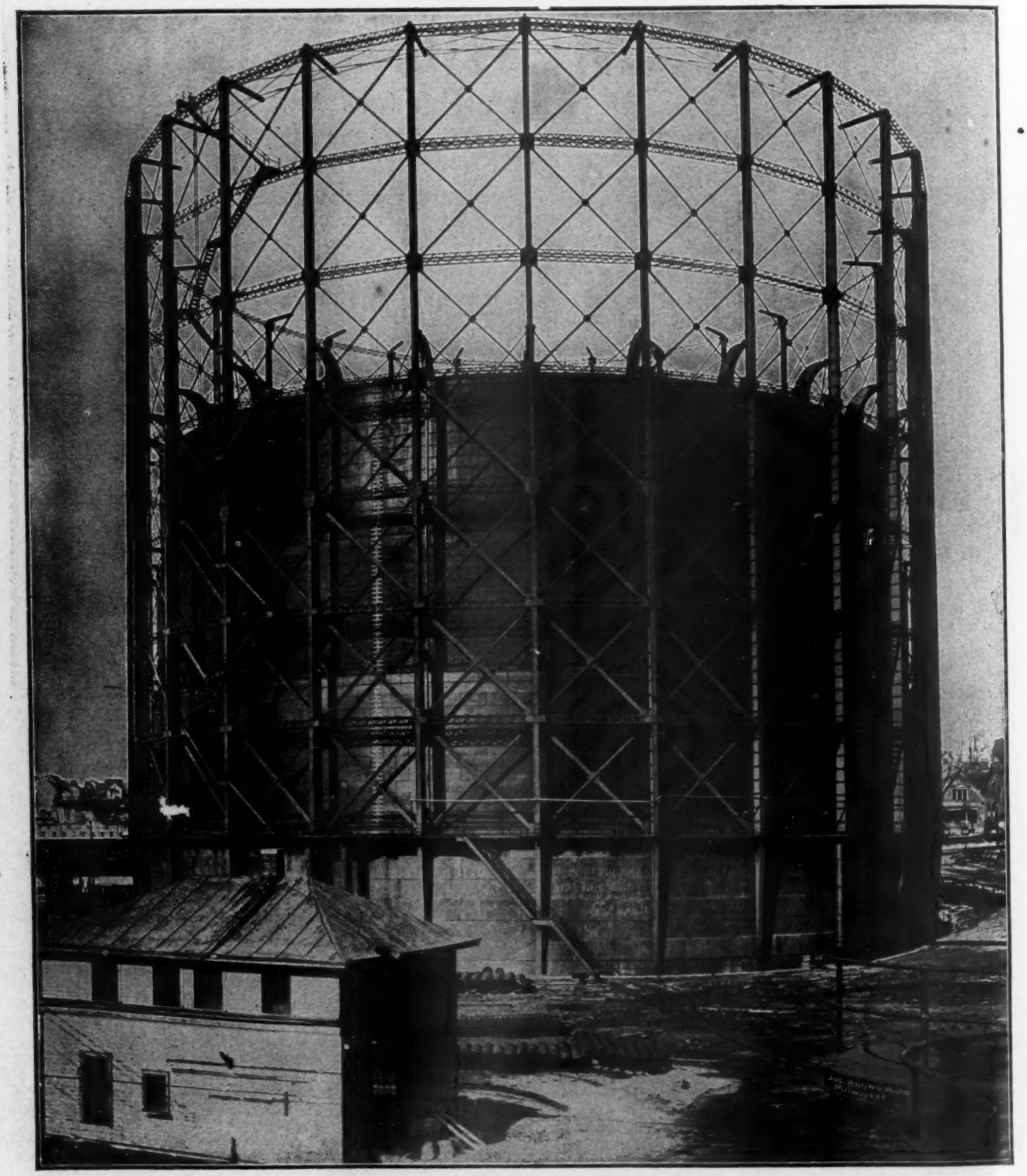
Society of Gas Lighting.—Annual meeting, December, 1910; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 1123 Broadway, New York.

Southern Gas Association.—Annual meeting, April 19-21, 1911, Montgomery, Ala. Officers: President, H. W. Frund, Salisbury, N. C.; Secretary-Treasurer, Jas. Ferrier, Rome, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. May, 1911, ———— Tex. Officers: President, W. B. Tuttle, San Antonio, Tex.; Secretary, H. B. Head Stephensville, Tex.

Wisconsin Gas Association.—Annual meeting, May ————, 1911, Milwaukee, Wis. Officers: President, W. H. Winslow, Superior, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.

Directory of American Gas Companies, 1909. **Price, $5.00.** For Sale by A. M. Callender & Co., 42 Pine St., N. Y.



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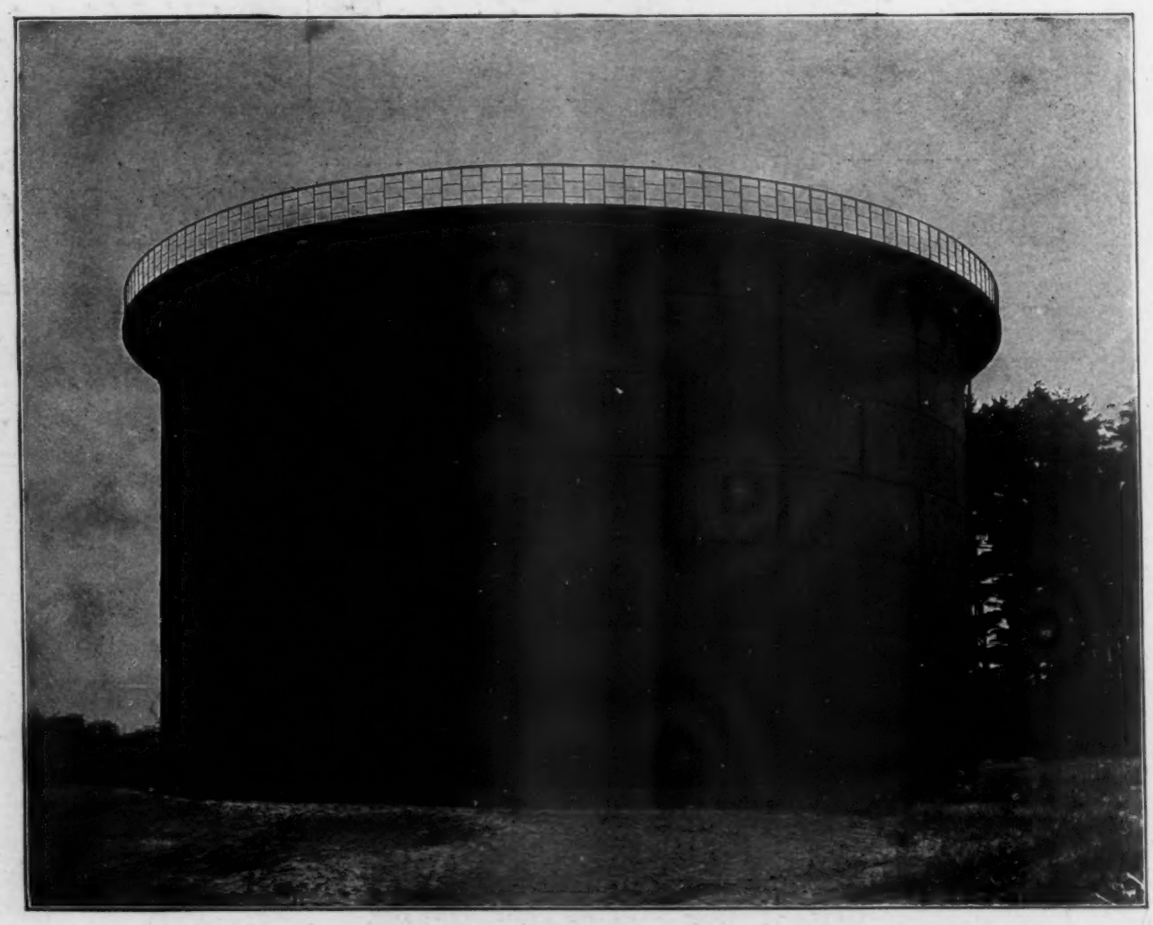

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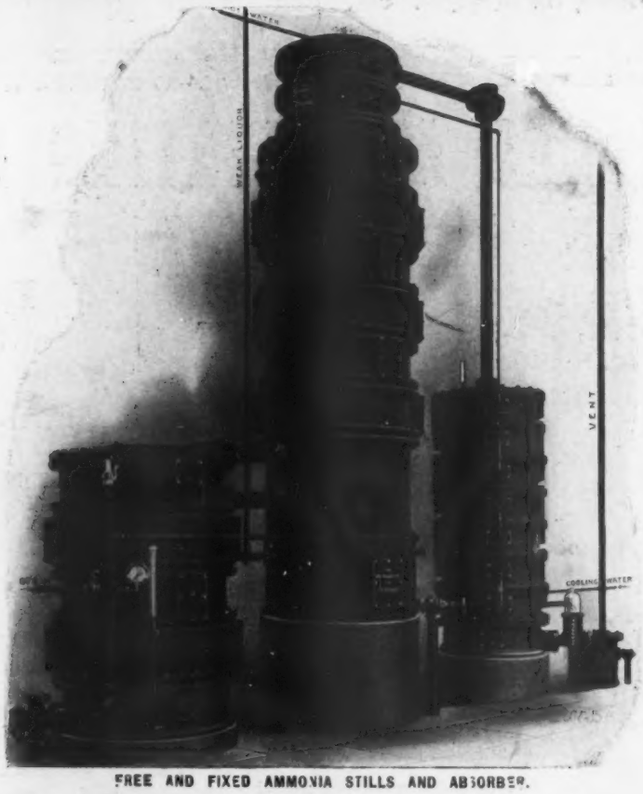

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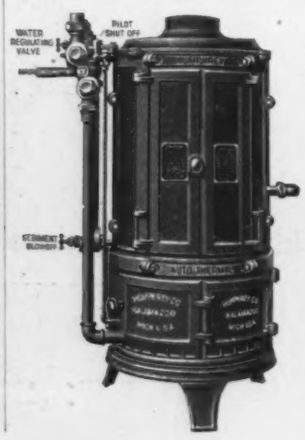

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SIZE . . .
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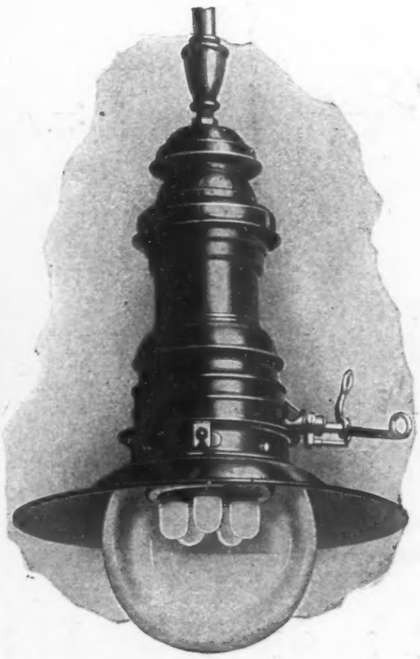

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CRESTON, IA.
DALTON, GA.
DAYTON, O.
DECATUR, ALA.
DELRAY, MICH.
DETROIT, MICH.
GUADALAJARA, MEXICO.
HENDERSON, KY.
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IOWA CITY, IA.
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MARINETTE, WIS.
MARSHALLTOWN, IA.
MENOMINEE, MICH.
MILWAUKEE, WIS.
MT. PLEASANT, MICH.
NORFOLK, VA.
OWOSSO, MICH.
PARIS, KY.
PEKIN, ILLS.
PHILADELPHIA, PA.
RICH HILL, MO.
RICHMOND, IND.
ROCKFORD, ILLS.
SALT LAKE CITY, UTAH.
SOUTH HAVEN, MICH.
SPRINGFIELD, ILLS.
STURGIS, MICH.
TACOMA, WASH.
TALLADEGA, ALA.
TRINIDAD, COL.
TUSCALOOSA, ALA.
VALPARAISO, IND.
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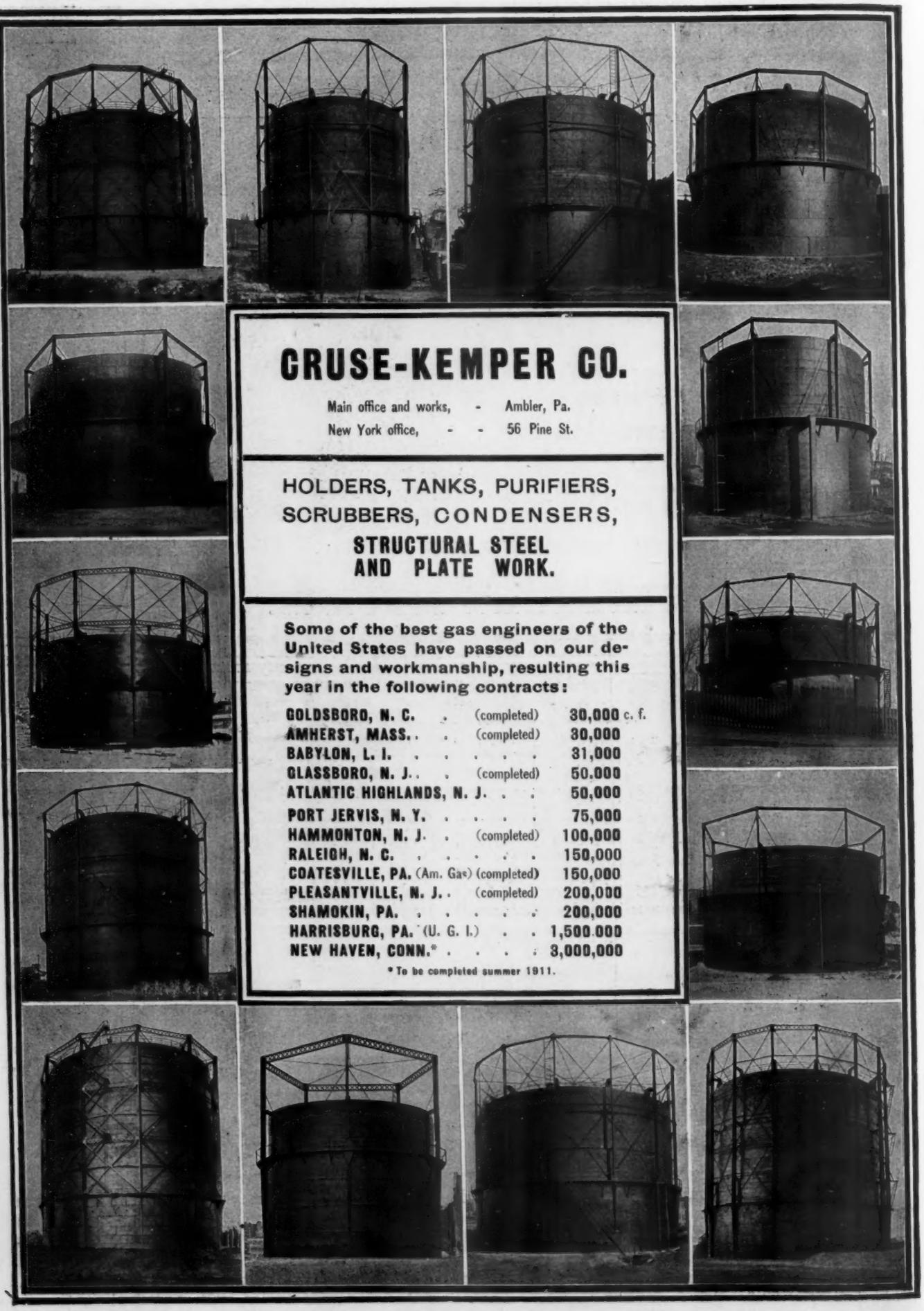

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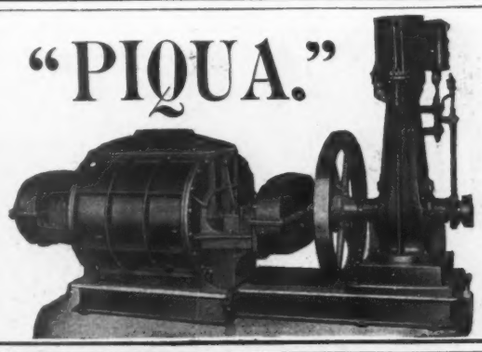

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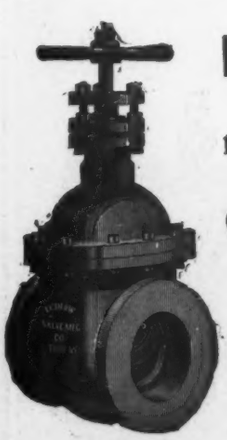

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Day of Week.	Table No. 1. FOLLOWING THE MOON			Day of Week.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING.		
	Date.	Light.	Extinguish.		Date.	Complete Lighting in 1 Hour.	Complete Extinguishing in 50 Minutes.
						From Time Given.	
		P.M.				P.M.	A.M.
Thu.	1	7.10	4.30 A.M.	Thu.	1	6.27	3.57
Fri.	2	7.10	4.30	Fri.	2	6.27	3.57
Sat.	3	7.10 N.M.	4.30	Sat.	3	6.17	4.07
Sun.	4	7.00	4.30	Sun.	4	6.17	4.07
Mon.	5	7.00	4.30	Mon.	5	6.17	4.07
Tue.	6	7.00	4.30	Tue.	6	6.17	4.07
Wed.	7	7.00	4.30	Wed.	7	6.12	4.07
Thu.	8	7.50	4.30	Thu.	8	6.12	4.07
Fri.	9	8.20	4.30	Fri.	9	6.12	4.07
Sat.	10	8.50	4.30	Sat.	10	6.02	4.17
Sun.	11	9.30 F.Q.	4.40	Sun.	11	6.02	4.17
Mon.	12	10.10	4.40	Mon.	12	6.02	4.17
Tue.	13	11.10	4.40	Tue.	13	6.02	4.17
		A.M.					
Wed.	14	12.10	4.40	Wed.	14	6.02	4.17
Thu.	15	1.20	4.40	Thu.	15	6.02	4.17
Fri.	16	2.30	4.40	Fri.	16	6.02	4.17
Sat.	17	No L.	No L.	Sat.	17	5.52	4.27
Sun.	18	No L. F.M.	No L.	Sun.	18	5.52	4.27
Mon.	19	No L.	No L.	Mon.	19	5.52	4.27
Tue.	20	6.30 P.M.	8.10 P.M.	Tue.	20	5.52	4.27
Wed.	21	6.30	8.40	Wed.	21	5.47	4.27
Thu.	22	6.30	9.10	Thu.	22	5.47	4.27
Fri.	23	6.30	9.50	Fri.	23	5.47	4.27
Sat.	24	6.30	10.30	Sat.	24	5.37	4.37
Sun.	25	6.20 L.Q.	11.30	Sun.	25	5.37	4.37
Mon.	26	6.20	12.30 A.M.	Mon.	26	5.37	4.37
Tue.	27	6.20	1.40	Tue.	27	5.27	4.37
Wed.	28	6.20	2.40	Wed.	28	5.32	4.37
Thu.	29	6.20	4.50	Thu.	29	5.32	4.37
Fri.	30	6.20	4.50	Fri.	30	5.32	4.37

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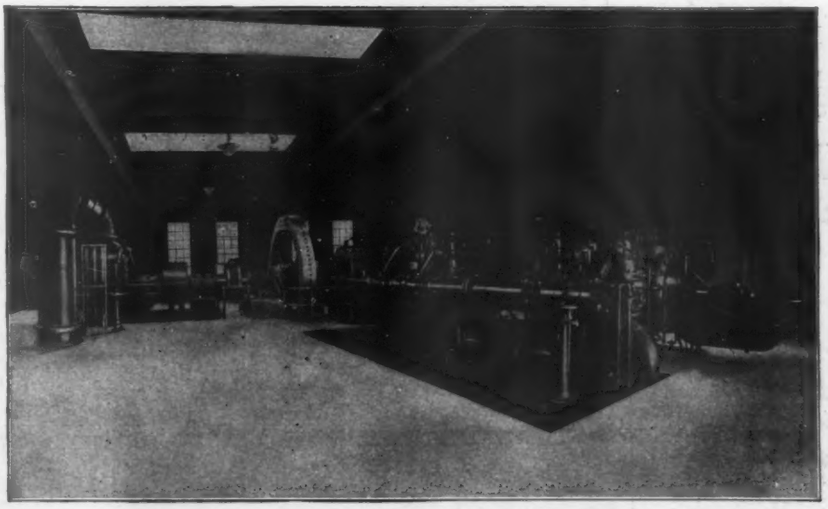

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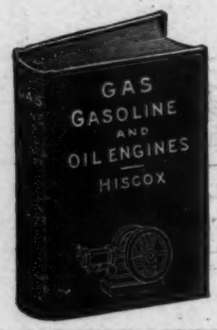

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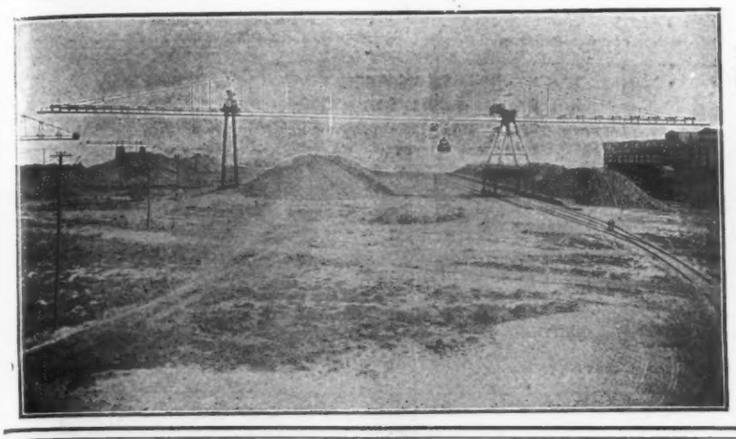

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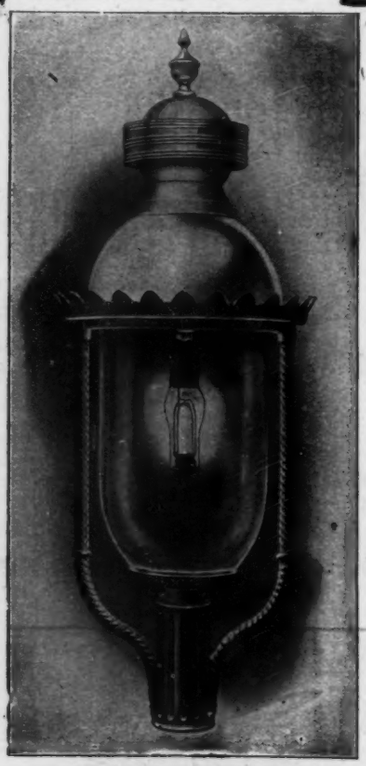

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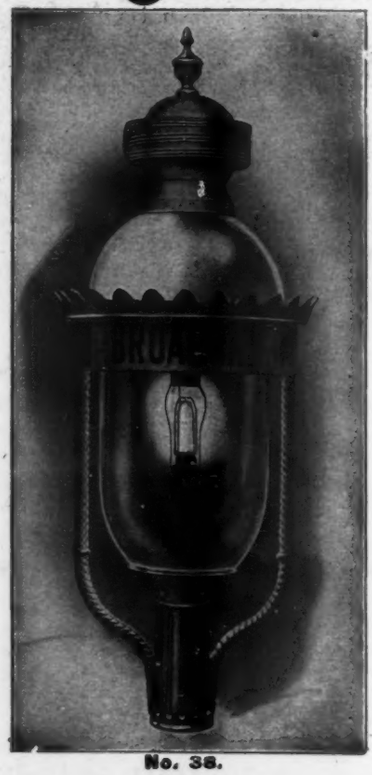

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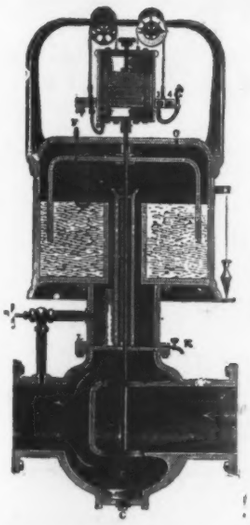

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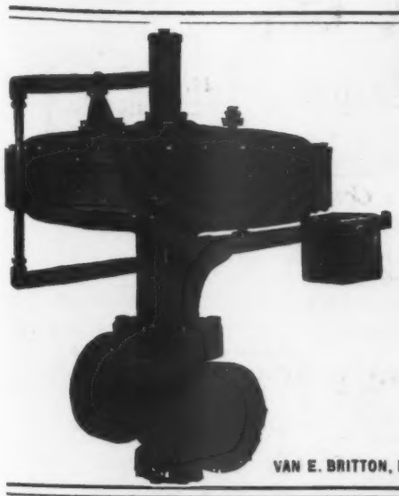

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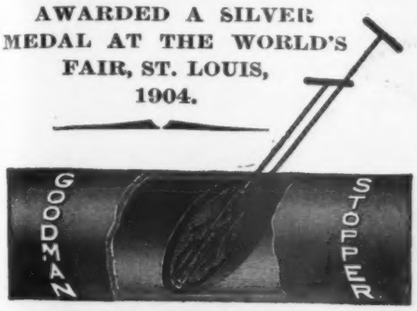

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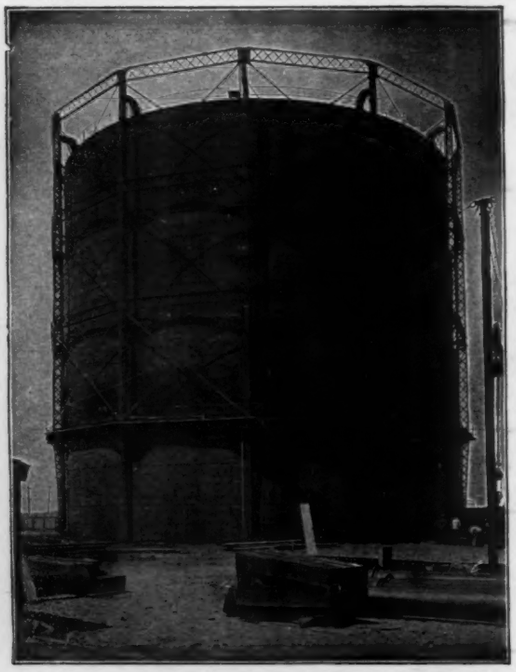

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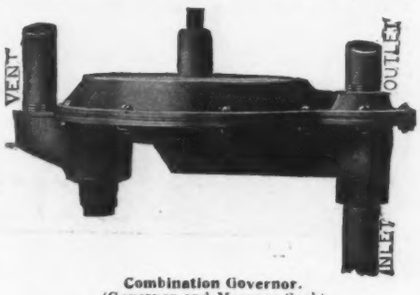

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